

INDIA RUBBER WORLD

Published at 420 Lexington Avenue, Graybar Building, New York, N. Y.

Volume 84

New York, June 1, 1931

Number 3

Plastics

THE products covered by the industrial term plastics include natural and synthetic resins, cellulose ethers and esters which may be caused to assume definite shapes either by a chemical reaction or by heat and pressure in a metal mold. They have been classified as follows:¹

Synthetic Plastics

1. Natural Gum, Wax, Shellac, and Asphalt Compounds. Manufactured with or without drying oils in combination with inert fillers such as wood flour, asbestos, clays. Examples: Phonograph records, battery jars.

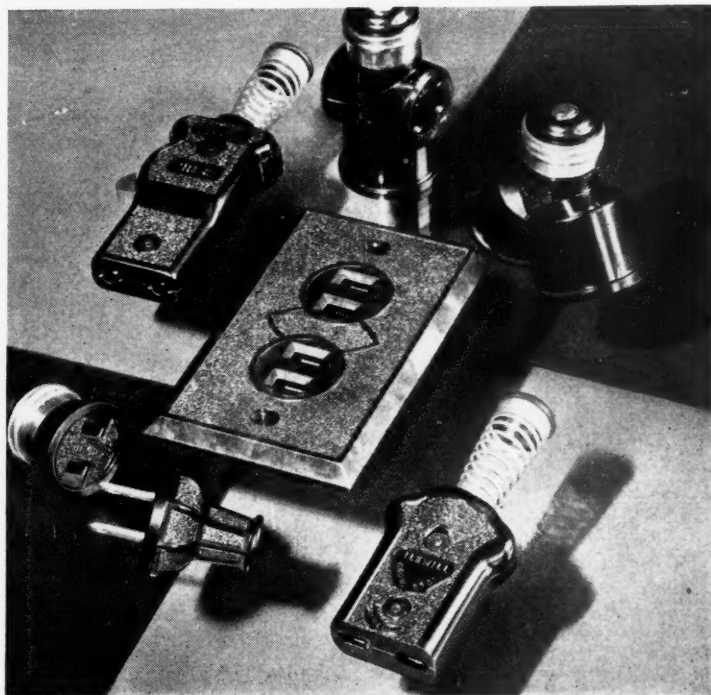
2. Casein Plastics. Casein, a by-product of the milk industry, when treated with formaldehyde forms a hornlike substance, capable of taking an excellent polish, of being softened by oil and molded. It is non-inflammable and can be made with beautifully mottled effects. Examples: Pencils, jewelry, translucent materials.

3. Albumen Plastics. Resemble the casein products, although more easily molded and dyed.

4. Cellulose Base Plastics. Derived from nitro-cellulose or pyroxylin. Non-heat resistant, flexible, used as a sandwich material between layers of glass in the manufacture of safety glass. Examples: Toilet articles, photographic films, automobile curtains.

¹"The Plastic Age." *Technology Review*, Oct., 1930, pp. 25-30.

²"Synthetic Resins." W. H. Nuttall, *Chem. Ind.*, Apr. 10, 1931, pp. 299-302.



Bakelite Corp.

5. Cellulose Acetate Plastics. Closely related to 4, except that they are non-inflammable. Because of their lack of plasticity, used largely in sheet form. Examples: Safety films, cellophane.

6. Synthetic Resin. The most important are the phenolic resins such as Bakelite and the newer materials of the urea-formaldehyde type, Beetle, for example. Extremely plastic in the formative period, these products have great strength, and high insulating qualities.

Molding Resins

In synthetic resins² we have an entirely new class of commercial products which

are constantly finding fresh applications and uses. In the first place, it is important to note that, speaking generally, up to the present, synthetic resins are not to any very great extent replacing the use of natural ones. The extremely rapid growth of the use of synthetic resins is mainly due to the fact that most of them possess one extremely valuable property lacking in the natural resins, with the possible exception of shellac: namely, the thermo-hardening properties of the synthetic resin.

Resins of the phenol-formaldehyde, urea-formaldehyde, and thio-urea-formaldehyde types all owe their value to the fact that the effect of heat is first to fuse them and then to harden them to an infusible solid. They form, therefore, the ideal basis of molding media. By mixing these resins with fillers, usually wood-flour and pigments, mold-

ing powders are produced, which on introducing into a polished die, and pressing in a press for a few minutes at a temperature of 130-180° C. give a molding of exquisite finish, of intricate design, if necessary with metal parts molded in place and of a variety of color effects. Because during the molding process the resin has fused and then hardened to an infusible solid, the moldings can be removed from the hot molds without fear of warping so that the process is well adapted for rapid production of multiple parts.

One of the main outlets of synthetic resins of the phenol-formaldehyde type is in the manufacture of molded parts of all descriptions: wireless components, such as the bases of valves, insulating parts, wireless cases, ash trays, knife handles, clock cases, etc.

Laminated Insulation

The thermo-hardening properties of resins of the phenol-formaldehyde type also find another application in the manufacture of laminated sheets, having either a paper or cloth base. Suitable paper is passed through an alcoholic solution of a phenol-formaldehyde resin, and the solvent removed without the application of excessive heat. If a large number of sheets of paper, so treated, are superimposed and pressed between metal sheets in a hydraulic press at a temperature of 130-180° C., fusion and subsequent hardening of the resin takes place, and a sheet of hard compact material results. This possesses exceptional electrical properties, and apart from its use as Bakelite sheet, it finds very extensive application in the manufacture of high tension electrical plant, especially in transformers, where its oil-resisting and heat-resisting properties are of special advantage.

If such treated paper is produced in a continuous length and is wound round a hot mandrel in a suitable tube-winding machine, and the mandrel is then baked, preferably in a mold, a tube of either circular or rectangular section is produced. Such tubes are very largely used in switchgear, owing to their good electrical insulating properties. Or, again, the paper treated with the synthetic resin may be employed for the manufacture of what are known as condenser bushings, used for insulating high-tension leads from transformers, switchgear, etc.

The above is a rough summary of the main uses of synthetic resins of the phenol-formaldehyde type. This name, of course, is largely a generic one, since cresols, on account of cheapness, are frequently used in place of phenol, and the properties of the resins produced can be regulated by the type of cresols used.

English Practice

So far as England is concerned, the synthetic resin next in importance to the phenol-formaldehyde type is that manufactured from thio-urea and formaldehyde. These two chemicals readily condense together in presence of a catalyst—usually a very dilute acid—to give a resin soluble in water, but insoluble in most organic liquids. It has thermo-hardening properties and can be readily molded. It is the basis of the well-known Beetle ware. Up to the present this is its main application.

Urea also readily condenses with formaldehyde giving a transparent, almost colorless glass-like resin. Its manufacture has been developed in Austria under the name of Pollopas, and attempts have been made to exploit it in England for use as windscreens as, when fractured, it does not readily splinter. However considerable technical difficulties have been encountered in producing sheets with plane surfaces, and there seems but little possibility of its becoming a serious competitor to the laminated glass, such as Triplex, now so largely in vogue.

Lacquer Resins

In glyphthal resins we enter upon an entirely different class from those hitherto considered. They are formed essentially by the condensation of glycerol and phthalic anhydride, but their hardness, flexibility, etc., can be modified very considerably by the incorporation of an organic acid, such as succinic. They form clear transparent resins, but their application as such is somewhat limited owing to the high temperature required to convert them into the insoluble and infusible form. This temperature is considerably higher than that of the charring point of cellulose.

By the incorporation of heat-hardening resins with the glyphthals, however, there is obtained a series of artificial resins, which readily harden under heat treatment. The flexibility and hardness of the baked resin can be varied within wide limits. Thus, for example, we have a lacquer suitable as a varnish for rubber and rubber leather cloth. When applied to the unvulcanized material and dry heated, vulcanization of the rubber and hardening of the resin take place simultaneously.

Glyphthal resins are replacing to some extent the use of shellac as a bond in the manufacture of micanite, in which flakes of mica are superimposed and molded to any desired shape. Micanite is employed as an electrical insulator, where high temperatures are likely to be encountered, so that the comparatively high temperatures, which the glyphthal resins are capable of withstanding, render them very suitable for making micanite. The glyphthal resins are also finding a useful outlet in the preparation of colored lacquers for electric-light bulbs.

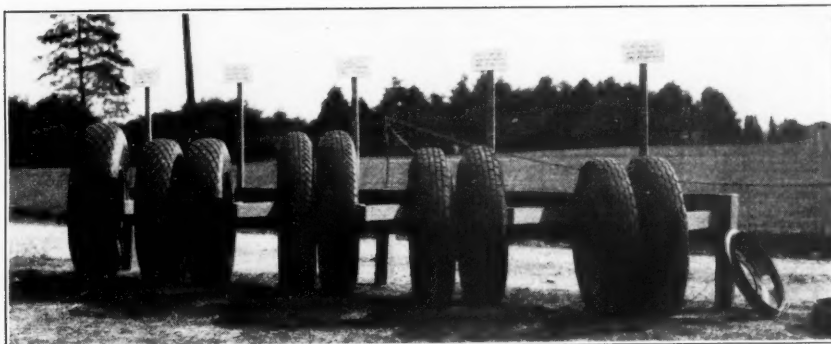
The cumar range of resins is usually classified as synthetic, though actually the resins are obtained as a by-product in the purification of coal-tar naphthas. Such naphthas, in the impure state, contain considerable quantities of indene, coumarone, and similar unsaturated compounds. If such naphthas are agitated with sulphuric acid without allowing the temperature to rise, the unsaturated compounds undergo polymerization to resins, which after removal of the acid and washing can be separated from the naphtha by distillation.

A whole range of cumar resins of various melting points and grades of color is now available, and finds an outlet in the manufacture of oil varnishes. We have here an instance of a synthetic resin replacing the natural gums, over which they possess one marked advantage. A natural gum, such as copal, is not soluble in linseed oil without a preparatory heat treatment, technically known as "running." During this heat treatment there is a considerable loss in material, and unless great care is exercised undue darkening results.

Cumar resins are directly soluble in hot linseed oil without any pretreatment, so that the process of varnish making is greatly simplified. Wood-oil varnishes, made up with cumar resins, have proved fairly satisfactory, though it is too early to say whether such resins will eventually replace the natural gums.

Another instance where synthetic resin has been used to replace the natural gums for varnish making is that of the Albertol range. A phenol-formaldehyde resin, though readily soluble in its unpolymerized state in alcohol, acetone, etc., is insoluble in benzene, naphtha, and paraffin hydrocarbons. This is doubtless due to the presence of hydroxyl groups in the molecule of the resin. If, however, these hydroxyl groups are esterified, then the resin becomes soluble in the usual varnish vehicles. The Albertols are synthetic resins of the phenol-formaldehyde type, the hydroxyl groups of which have been esterified by abietic acid from colophony. They are being actively pushed as substitutes for natural gums in varnish-making and have achieved a certain measure of success.

Motor Bus Impact Reactions



Courtesy of U. S. Bureau of Public Roads.

Tire Equipment Used in Bus Tests

AN illuminating study on the impact reactions produced on pavements by vehicle wheels recently has been reported.¹ Sustained high speed highway operation of motor busses and trucks for fast freight transportation was made possible by the introduction of high pressure and balloon tires.

In connection with such service one of the questions most frequently asked is, "What is the relative influence of the type of tire equipment on impact relation?"

Studies of the forces produced on the pavement by the same wheel when equipped with dual high pressure pneumatic, dual balloon, and single balloon tires of equal capacity and carrying the same load resulted in proving that there is no question as to the additional protection to the road which results from replacing high pressure pneumatic tires with balloon tires. The balloon tire operates at a lower inflation pressure and has a greater section height than the high pressure tire of equal capacity, both of which factors enhance its cushioning properties. Since protection to the road is also protection to the vehicle, this comparison has a major economic significance. The road strikes the vehicle wheel just as severely as the wheel strikes the road.

Only 15 per cent greater pavement thickness is required to support a $7\frac{1}{2}$ -ton balloon-tired truck than for a 7-passenger car. If cushion and solid tires were used and the truck operated at 20 miles an hour, a greater thickness of slab would be necessary, averaging 31 per cent for cushion tires and 42 per cent for solid tires greater than the minimum practicable thickness required for 7-passenger automobiles.

The impact reaction after passing over a $1\frac{1}{2}$ by 30-inch inclined plane and a $1\frac{1}{2}$ by 12-inch rectangular obstruction in all tests was decidedly less where single balloon tires were used, with dual balloons second and high-pressure tires the greatest. In passing over the $1\frac{1}{2}$ by 12-inch obstruction using 7-inch dual high pressure tires with 100 pounds' pressure, the impact increased up to 30-miles an hour until it reached 30,000 pounds and remained stationary up to 50 miles an hour. With 9.00-inch dual balloon tires, using 61 pounds per square inch pressure, the impact rose to 24,000 pounds at 20 miles an hour and dropped off at 30 miles an hour until it reached 20,000 pounds at 50

miles an hour. But using 12-inch single balloons with 82 pounds' pressure the impact reaction rose to only 21,000 pounds at 20 miles an hour and dropped off sharply to 17,000 at 50 miles an hour, showing the effect upon the road of balloon tires of low pressure to be less than with other types.

Graphs of road shock with the same obstruction show a steady rise to over 30,000 pounds with 7-inch dual high pressure tires, using 100 pounds to the square inch, a steady rise with 9-inch dual balloon, 61 pounds to the square inch, to 25,000 pounds at 50 miles an hour, and a rise to only a little over 20,000 pounds using 12-inch low pressure single balloons. Impact reactions were found to vary in almost direct proportion with the inflation pressure; and as for speed, shock reactions were found to increase in approximately direct proportion with speed. Thus loads on trucks using balloon tires do less damage to the pavement and vehicle than the same load on trucks using other types of tires. The tire loading weight is set at the capacity which the tire will carry.

The results of these impact studies are summarized as follows:

The data on hand were obtained under experimental conditions strictly limited as to tire sizes, tire loads, inflation pressures, rim diameters, rim widths, types of obstruction, and vehicle speeds. Subject to these limitations, the following conclusions have been established:

1. Within the economic range of tire inflation pressures (roughly 10 per cent below and above standard), impact reactions vary in almost direct proportion to inflation pressures.

2. For the speeds attained during these tests (up to approximately 55 miles per hour), shock reactions increase approximately in direct proportion to speed.

3. Drop reactions reach maximum values at relatively low speeds, and reactions equal to these maximum drop values are not reached under shock conditions except at relatively high operating speeds.

4. For a given natural road roughness condition, the maximum drop reaction which is obtained at a relatively low speed is not exceeded by the shock reactions, except those obtained at relatively high speeds.

5. Severe roughness conditions, such as may be occasionally found existing on actual pavements, may cause reactions as great as three or four times the static wheel load, with high-pressure tire equipment. However it should be stated that roughness conditions which cause such excessive

(Continued on page 65)

¹"Impact Reactions Developed by a Modern Motor Bus." By James A. Buchanan, *Public Roads*, Vol. 12, No. 2, Apr., 1931. U. S. Dept. of Agriculture, Bureau of Public Roads, Washington, D. C.

Paragutta

A. R. Kemp¹

TO TAKE care of the growing telephone traffic between the United States and Cuba a new cable has been provided to supplement the three cables placed in operation in 1921. A novel feature of its construction is its insulation by "paragutta," which plays an important part in extending its frequency range for carrier-current operation.

The electrical requirements placed upon the insulation of deep sea telephone cables are much more drastic than those for telegraphs. At the higher frequencies of telephonic operation the electrical losses in the insulating material become an important factor and limit the length of cable which can be operated.

These circumstances led to an exhaustive investigation of the factors influencing the electrical and physical characteristics of submarine insulation. One result of these studies was the development of paragutta, which, by virtue of its superior insulating properties, is expected to be a vital factor in making feasible the installation of submarine telephone cables with long spans as well as in improving telegraph transmission.

The improved insulating properties of a new material would be offered in vain if any of the unusual virtues of the present materials were sacrificed. Mechanically they are unique and almost ideal, and years of manufacture have surrounded them with machinery and technique which it would be expensive to abandon. Thus in developing a new insulating material it was necessary to preserve the important features of the old.

For the past seventy-five years the standard materials for insulating deep sea cables have been gutta percha and balata. Aside from a small production from leaves on plantations, these substances for the most part are gathered and worked up by primitive people from the latex of certain tropical trees and, therefore, come upon the market dirty and in many forms. Excepting dirt and water-soluble substances such as albumens and sugars, their two main components are gutta hydrocarbon and resinous substances, in amounts which vary widely according to the source of the gum.

It is to their peculiar colloidal hydrocarbon, of a chemically unsaturated type, that these materials owe most of their valuable properties: their plasticity when warm, their toughness when cold, and the stability of their electrical characteristics when at sea bottom. By virtue of their

plasticity, the materials can be readily washed free from dirt and water-soluble impurities, the various grades can be thoroughly blended, and the mixture can be extruded onto the conductor in a continuous sheath of multiple layers free from mechanical defects. When the insulated conductor is drawn through cold water, the material quickly sets to a firm covering sufficiently tough and flexible to resist the handling in factory and cable ship.

Though the natural resins are usually allowed to remain in the material, they are sometimes removed to obtain the comparatively pure hydrocarbon. This can be done either by dissolving the material in warm, light petroleum naphtha, and filtering and refrigerating the solution to precipitate the hydrocarbon, or in a simpler manner by soaking the material in the same solvent at ordinary temperatures. The completely deresinated gutta, when carefully prepared from selected raw materials, has a specific conductance only one twentieth of that of the resin-bearing material and a substantially lower dielectric constant. But the advantages of these desirable electrical characteristics are for most practical purposes annulled by the added cost of the material and

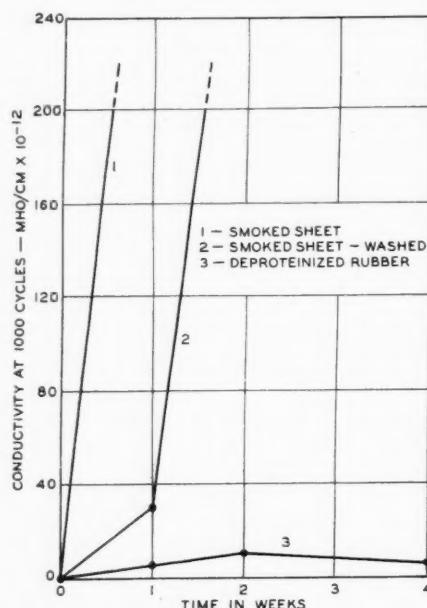


Fig. 1. Washing and removing proteins largely eliminates the increase in conductivity of rubber immersed in sea water at room temperatures for a period of weeks

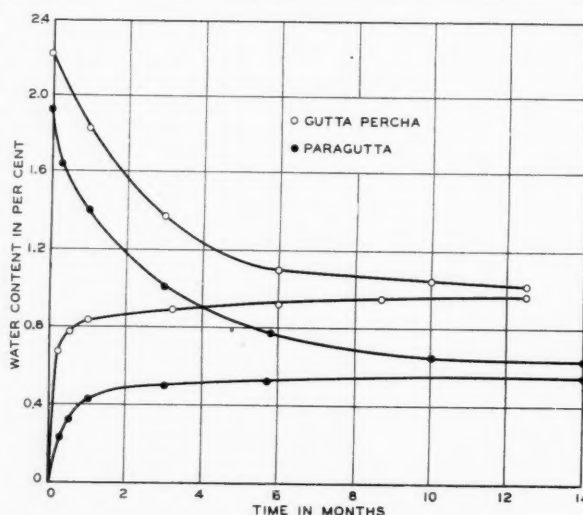


Fig. 2. A comparison of the equilibrium values of water content when immersed in sea water, and the rapidity with which these values are approached from both higher and lower initial contents, gives an indication of the comparative stabilities of gutta percha and paragutta

¹ Chemical Research, Bell Telephone Laboratories, Inc., New York, N. Y. From *Bell Laboratories Record*, May, 1931, pp. 422-25.

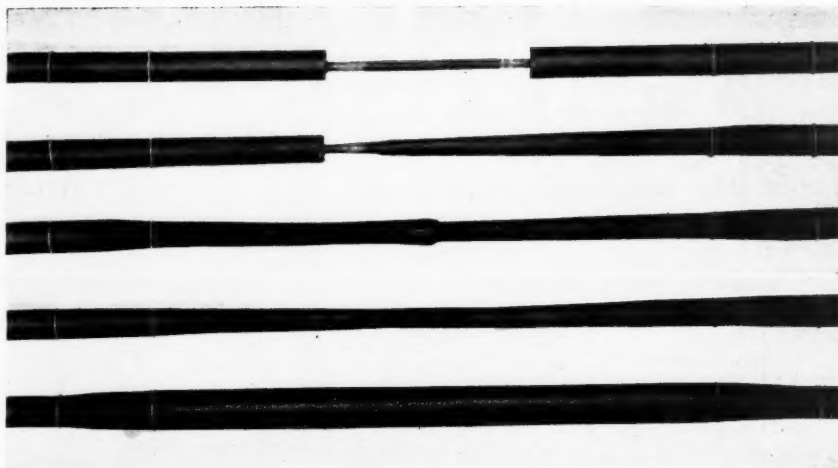


Fig. 3. The plasticity of paragutta is of great use in joining lengths of cable. Successive stages in splicing a core are shown above. (1.) Conductor splice completed. (2.) Insulation of one end drawn down over the splice. (3.) Insulation of the other end drawn down over its mate. (4.) Insulation shaped off. (5.) Application of additional paragutta leaves completed joint ready for application of jute and armor wires

even more by its insufficient plasticity at safe working temperatures.

It would be possible, however, to take advantage of these improved properties if there could be blended in appreciable proportion with the gutta hydrocarbon another cheaper material which would increase the plasticity when warm without impairing the electrical properties or contributing undesirable mechanical characteristics. Since rubber is the next of kin to gutta among materials commercially available at low cost, it naturally suggested itself for the purpose.

The principal constituent of crude rubber is a hydrocarbon, chemically undistinguishable from gutta hydrocarbon, but possessing radically different physical properties in that it is soft and elastic without thermoplastic properties. Upon heating and mastication, rubber becomes more or less permanently plastic, and in this state it blends perfectly with gutta to give a product of better working properties than gutta alone. Crude rubber besides being physically unsuited for use alone will also deteriorate electrically when immersed in water. Extensive experiments have shown that this instability is due to water-absorbing impurities and that the pure rubber hydrocarbon possesses as good electrical characteristics and stability in water as pure gutta hydrocarbon.

In contrast with gutta percha and balata, it was found that crude plantation rubber contained nitrogenous or protein bodies which were difficultly soluble in water and could not be readily removed by washing. The electrical instability of washed crude rubber in water appeared to be due to the proteins existing as a network throughout the mass, forming paths through which electrical conduction took place as soon as they absorbed sufficient water. As it was known that proteins could be changed by hydrolysis into water-soluble products, attempts were made to hydrolyze the proteins in rubber so that they could be subsequently removed by washing. This was finally accomplished by heating the rubber with water in an autoclave at an elevated temperature without injuring the hydrocarbon. The improvement in electrical stability thus secured is shown in Figure 1.

With two suitable materials for blending at hand—deresinated gutta percha or balata, and deprotenized rubber—it remained to determine the optimum proportions for a blend of these and whatever waxes might be used to modify

mechanical properties and reduce cost without electrical degradation. The superior mixture proved to be one of about 50 per cent gutta, 40 per cent rubber, and 10 per cent hydrocarbon wax, and was christened "paragutta," a name compounded from those of its two principal constituents. Exhaustive tests have shown that paragutta closely approximates gutta percha in mechanical properties, is fully its equal in electrical stability in water, and is a substantial improvement over it in specific electrical properties. In the latter respect, a superior grade of paragutta may under sea-bottom conditions have a specific conductance as low as one-thirtieth of that of ordinary cable gutta percha, and a 20 per cent lower dielectric constant. The practical importance of these characteristics may be seen by noticing, for example, that had paragutta been available to insulate a permalloy-loaded telegraph cable laid in 1926, its maximum satisfactory signalling speed would have been 30 per cent greater.

In the manufacture of paragutta, after the gutta percha or the balata has been washed by warm water and leached of resin by naphtha, and the rubber has been autoclaved to hydrolyze the proteins, the processing is similar to that previously used for gutta percha insulation and can be carried out with the same machinery. The treated gutta and rubber are blended and washed together and masticated to remove excess water and to incorporate the wax. The mixture is then strained through fine sieves under hydraulic pressure further to remove impurities, kneaded to express air, and finally placed on the rolls of the covering machine to be forced around the conductor.

Since the expense of failure in a submarine cable is unusually great, and minute defects in its insulation can do far-reaching damage, it is only after prolonged and careful tests that the present confidence in paragutta has been established among cable users and manufacturers. From much confirmation the assurance in paragutta now justifies its commercial use.

Selenium and Hard Rubber

A hope raised that with selenium, a hard rubber vulcanizate could be produced, that would have properties superior to one obtained solely with sulphur is as yet unrealized. While selenium can impart to soft rubber exceptional aging, abrasive, and other desirable qualities, as well as speed up curing and allow larger use of reclaim without lessening wear-resistance, its useful functions seem to be limited to supply products.

According to Nuttall and Kirkwood it is impossible to produce hard rubber with selenium. They point out that when selenium is used in place of sulphur, even to excess, and despite ultra-accelerators and high temperatures, only a limited amount of selenium enters the rubber molecule, and only a soft rubber can result.

Such a strange difference between sulphur and selenium is explained by assuming that as soon as the terminal double bonds of the rubber molecule are saturated with sulphur, the adjacent double bonds immediately become activated so that combination with sulphur takes place progressively along the molecule; but with selenium no such activation results.

Vultex¹

Characteristics and Rubber Manufacturing Applications of Vulcanized Latex

A FORM of liquid rubber of much scientific interest and importance is that known as Vultex. It is produced by vulcanizing in solution the rubber particles in latex by means of a patented process.²

This vulcanization, which may be carried out either at atmospheric or high pressure, alters the shape and size of the particles as seen under an ultramicroscope and definitely adds to the value of the rubber latex from which it is made. Vulcanized latex is practically sterile, of good stability, and, except in special formulations, contains no added preservatives or foreign stabilizers. A film obtained by evaporation of the dispersing phase has all the properties of cured rubber. Such films show greater resilience, greatly increased elasticity, resistance to solvents, marked tensile strength, and are but slightly affected by heat changes.

Base vultices are produced in numerous formulations by several procedures in various total solid contents up to 70 per cent. The various cures used are adjusted to meet individual requirements. For example, when intended for the manufacture of dipped goods to be subjected to high sterilization temperatures, vulcanized latex is so cured as to withstand the normal depreciation of the rubber under such conditions. By another popular cure the rubber will show no permanent set, and have a tensile as high as 5,000 pounds per square inch with 850 per cent elongation at break. It is not limited to ultra-accelerator formulations.

Vulcanized latex is readily compounded with any material, with certain exceptions, that is dispersible or emulsifiable in water. The exceptions are calcium magnesium or zinc compounds that are appreciably soluble in water, or other materials strongly positive or acid in nature. Vultex retains the negative colloidal characteristics of latex; consequently positive electric charges will tend to neutralize the original electric charge and cause varying degrees of coagulation. If positively charged material must be added for compounding, the negative value of the vulcanized latex must be increased as by the addition of other negative colloids such as casein, glue, soap, or gums, or by the free ammonia and dissociated alkaline materials.

Dispersion of filling materials is best accomplished by wetting such with about an equal weight of water to a uniform consistency in a colloid mill. By careful treatment it is possible to disperse zinc oxide, carbon black, and obtain in some measure the reinforcing effect such materials produce in rubber. Crude dispersion methods such as stirring powders in the dry form directly into vulcanized latex, give a non-homogeneous and greatly degraded rubber. Colloidally dispersed fillers may be added in any amount; consequently almost any formulation found satisfactory in masticated rubber may be produced from a vultex base similarly compounded. Dispersing or wetting agents may be necessary with some fillers that are wet with difficulty. Such agents are frequently stabilizers or negative colloids. By controlling the viscosity of the vultex base, the compound material is held permanently in suspension.

As a manufacturing proposition liquid rubber possesses distinct economic and technical advantages over the proc-

esses of mastication or solution. These advantages, as they apply particularly to the use of vulcanized latex over the mastication of solid rubber, are no mastication; no curing; maintaining the full nerve of the rubber; greater resistance to solvents; and no grain in the rubber.

Compared with making solutions of rubber with naphtha, vulcanized latex methods eliminate mastication, churning, fire and health hazards, loss or recovery of solvents, odor, and grain while maintaining the full nerve of the rubber and producing highly concentrated solutions of greater covering capacity.

Comparing the use of vulcanized latex with unvulcanized latex in rubber manufacturing the following points of superiority are claimed: namely, good aging quality; no curing eliminates curing apparatus, time, and investment; sterile solutions; freedom from fixed alkali or foreign soaps; uniformity of dispersion of compounding ingredients; less tacky, non-gumming in paper manufacture; spreads more uniformly; stock readily colored, and non-fading results are possible; fabric is not subjected to high temperatures which may weaken; purified rubber substantially free of protein and water-solubles are possible in cured solution; vulcanization controllable by accelerator removal; non-blooming stocks possible; stock is more resistant to solvents.

Vulcanized latex has been developed for many industrial needs. Many processes in which latex uncured was used fifty or more years ago have become of renewed interest and are now found practical. Among the successful applications of vulcanized latex are its use in paper, or fabrics as a saturant to secure tear resistance, water resistance, plumping, or stiffening. Because of its crumbly coagulum and non-tacky nature it is especially suited for use in paper beaters and effectively prevents the gumming up of felts or wires so common with ordinary latex. Its oil resistance has led to grease-proof papers of improved types and produced at less cost. Dipped goods of sterling quality, such as surgeons' gloves, ink sacs, and balloons, are readily prepared. Proofings are being produced for shower curtains, raincoats, single or double texture materials, by methods of greatest ease, and resulting in a rubber capable of definite manufacturers' guarantees as to life or non-fading of colors. Transparent compounds coated upon high grade silks have withstood aging in a Geer oven for over 1,500 hours; and in the Bierer-Davis bomb, silk or rayon fabrics decompose before the rubber coating loses its pliability or softens. Indications are that these proofings can be made to rival and possibly outlast cotton fabrics.

Double texture combining adhesives of vulcanized latex are finding favor, owing to the fact that few coats are necessary and such fabrics with high surface frictions are prepared without subsequent curing. When a vulcanized latex mixing is applied to the back of rugs, the rug is made non-slip but does not stick to the floor, nor is the highest polished floor or the most expensive rug harmed by this application. Cures of high dielectric strength are possible for insulation of electric wiring, electricians' gloves, or the impregnation of papers or fabrics used in electrical insulation.

In general, Vultex processes are rapid and adapted to continuous production methods, as for example in the manufacture of rubber sheeting.

¹Data supplied by Vultex Chemical Co., Cambridge, Mass.

²U. S. Patents Nos. 1,443,149 and 1,682,857.

Garden and Spray Hose

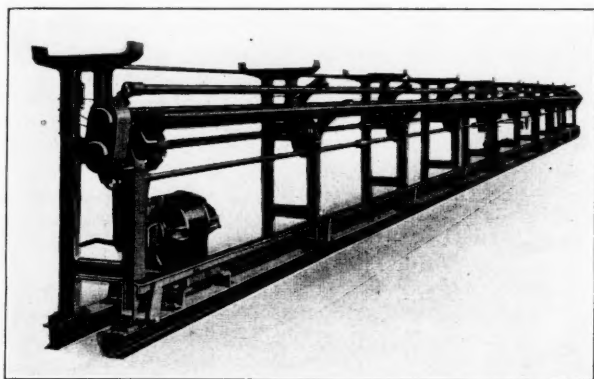


Fig. 1. Thropp Wrapped Hose Machine

THE common practice is to designate hose by the name of the work it is to perform. Nearly 140 types of industrial hose service have been listed,¹ but modern industry has a thousand or more needs of rubber hose. These requirements are so varied that proper choice of hose for specific service must be based on engineering knowledge. Adaptation of the means to the end can be profitably exercised even by the user desirous of securing service economy in the choice of garden hose.

Hose Construction

Prior to 1861 rubber hose for all purposes was made by hand. The inner tube was prepared by joining around a pole of suitable diameter a sheet of rubber cut wide enough to cover the circumference of the pole. Bias cut pieces of woven fabric impregnated and coated with rubber on a "friction" calender were joined, making a sufficiently wide wrapper for the hose to give the desired number of plies. This was applied by hand as also was the sheet of rubber that served as the waterproof cover for the hose.

Previous to 1900 the only noteworthy improvement over hand making in the manufacture of rubber hose was the introduction of the 3-roll machine for wrapped hose in 50-foot lengths. For a long period this was the only machine method of hose making. It is still the general method of making hose but is completely outclassed by two other processes adapted for mass production of small hose in continuous lengths. Hose made by each of these improved methods is lead encased for vulcanization.

Garden and lawn hose and that designed for spraying purposes are made in the same sizes: namely, $\frac{1}{2}$ -, $\frac{5}{8}$ -, $\frac{3}{4}$ -, and 1-inch internal diameter. They are built for different working pressures and with tubes of different composition for conducting water or resisting the action of chemicals and solvents. Water hose for garden use is designed for working pressures from 70 to 145 pounds. Hose for agricultural or paint spraying is built for service at 500 pounds pressure. The lower service pressure for which garden hose is intended, renders it unsuited for spray hose purposes; consequently it should never be so used.

¹"The Industrial Hose Hand Book." By Edwin P. Rutan, Electric Hose & Rubber Co., Wilmington, Del.

²"The Manufacture of Molded Garden Hose." INDIA RUBBER WORLD, Nov. 1, 1924, pp. 75-76.

Machine Methods of Hose Making – Wrapped Short Lengths – Braided and Wrapped Long Lengths—Physical Test Requirements—Care of Hose in Service

Wrapped Hose

The familiar rubber and fabric hose, of which garden and spray hose are examples, formerly was always made on 52-foot steel poles on the type of machine pictured in Figure 1. Its construction comprises a rubber lining or water way of seamless rubber tube wrapped around by several plies of rubberized duck. This fabric gives necessary strength to resist the pressure of the water conducted by the hose in service and gives the hose strength lengthwise as well. The hose is completed by the addition of a covering of sheet rubber of tough composition to resist wear when the hose is dragged about on the ground.

Braided Continuous Hose

Garden, spray, and other small sized hose were first made in 500-foot lengths by radically different machinery from the customary 50-foot lengths of fabric hose.² Its construction by braiding is specially adapted to continuous production at a rate of speed exceeding that obtainable with the scheme of making wrapped hose in 50-foot lengths.

Double deck braiders and the lead press are special equipment featuring the system for making braided molded hose. These are pictured in Figures 2 and 3.

The construction of braided hose is conducted on the following plan. A seamless rubber tube is held inflated to about 2 pounds air pressure by sealing its ends as it is reeled in 500-foot lengths ready for application of two plies of cotton yarn braided over it as a strengthening element. The first ply of braid is laid direct upon the tube as it passes the lower deck of the braider into which it is fed off the reel from beneath the machine. As the tube advances to the second deck, two strips of calendered rubber are fed upwardly upon it from reels at either side. These

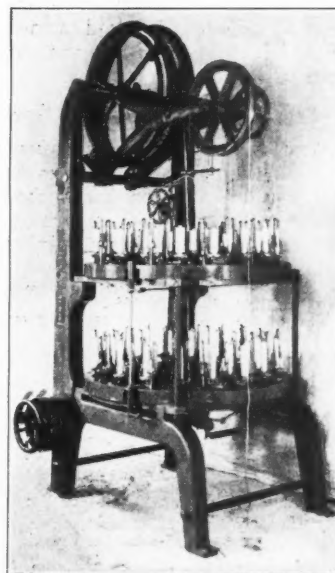


Fig. 2. New England Butt Double Deck Braider

strips constitute the intermediate layer of rubber to secure adhesion between the first and the second plies of braiding.

The operation of covering the outer ply of braiding with rubber is effected by drawing the hose, still lightly inflated, through the hollow forcing screw of a tubing machine. As it emerges at the die, the hose is covered with a uniform definite thickness of rubber.

Long length braided and molded hose possesses advantages in economy of manufacture and the sales advantages that arise from better exterior appearance and the added convenience of greater length in one piece. Some engineering advantages claimed for hose of braided construction are discussed in an earlier issue³ which summarized the basic principles for constructing hose designed to withstand internal pressure.

Wrapped Continuous Hose

The manufacture of wrapped hose in long lengths is a recent accomplishment made possible by means of the machine pictured in Figure 4. In operation the hose tube is run in lengths of 500 feet or more and arranged on a revolving pan at the front end of the machine. Frictioned duck, bias cut and spliced in a continuous roll, is also arranged at the front end of the machine.

The lightly inflated tube and the duck are fed simultaneously through the machine. In the course of its progress the duck is rolled about the tube, and the hose is received and coiled on a revolving pan at the discharge end of the machine.

The rubber cover can be applied in the making machine or by passing the hose through a die in a tubing machine preparatory to encasing in lead for vulcanization.

This machine is normally capable of producing 50-feet of hose per minute. The lead molded finished hose is superior in appearance, friction test, and bursting strength to mandrel built fabric hose.

Best Size for Garden Hose

Aside from its type of construction the best size of garden hose is $\frac{5}{8}$ -inch because it carries the stream from the sill cock with the least friction and without waste. The consumer gets in $\frac{5}{8}$ -inch hose the size which will give the best service, and he buys more economically because of the better com-

³"Braided vs. Wrapped Hose." Andrew D. MacLachlan, *INDIA RUBBER WORLD*, July 1, 1927, pp. 199-200.

⁴Federal Specifications No. 588 (ZZ-H-601), Bureau of Standards, Washington, D. C.

⁵Federal Specifications No. 45 (ZZ-H-521), Bureau of Standards, Washington, D. C.

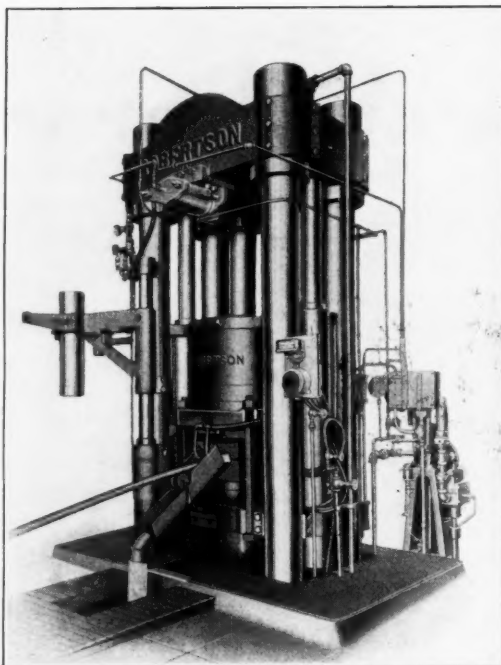


Fig. 3. Robertson Lead Press for Continuous Hose

mercial conditions behind his purchase of a standard product. This step forward in standardization resulted some years ago from the efforts of the Mechanical Rubber Goods Division of The Rubber Manufacturers Association, and is supported by the various national wholesale and retail hardware associations.

Physical Test Requirements

It is of interest to note that physical test requirements of small water and spray hose are contained in proposed revised specifications for braided water hose⁴ and wrapped fabric spray hose.⁵

In both instances these proposed requirements are for hose for military and naval use and exceed those to be expected in commercial hose.

Care of Hose

The durability of hose in service, even that of specified high quality, may be seriously reduced by lack of proper handling. Even in such simple service as lawn sprinkling, care of the hose will repay the effort. In this connection the user should avoid kinking the hose and should keep it reeled when not in use rather than allow it to lie tangled or extended on lawn or gravel path to be stepped upon, run over, and dried out by the heat of summer sun.

Armored hose is effectually protected from kinking by the wire winding which prevents sharp bends. This non-kinking feature is particularly worth while for garden hose at the end where it is attached to a sill cock or other fixed outlet. Protection in this particular can be made available for unarmored hose by the simple expedient of coupling to it a short piece of armored hose about 3 feet long with which attachment to the sill cock is made. This practical expedient well repays its trifling cost and is generally applicable to hose for general purposes as well as for garden and lawn use where it seems first to have been used.

Similar precautions apply profitably to handling hose for both agricultural and paint spraying. In the latter service it pays to clean the hose after use. It can be properly cleaned by using the same solvent contained in the paint, blowing it through the hose with steam or air. If this solvent is not available, it is recommended that alcohol or even gasoline should be used. In any event the paint should all be blown out of the hose. Otherwise if it dries in the hose, it will harden on the inner tube and cause it to crack when making sharp bends. Then when the hose is used again, the flaked dry paint will affect the job or may clog the nozzle.

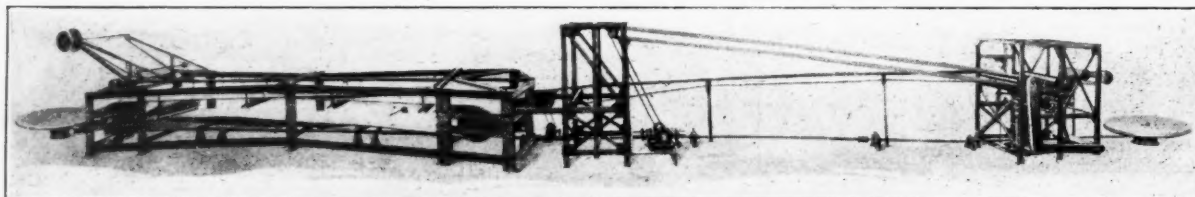


Fig. 4. Spadone Continuous Wrapped Hose Making Machine

X-Ray Studies of Gutta Percha and Balata¹

Charles W. Stillwell and George L. Clark²

THERE has been considerable disagreement as to the significance of x-ray diffraction data for gutta percha and balata as reported by different investigators. The main point at issue has been the fundamental difference between gutta percha and balata. Clark³ and Hauser⁴ have obtained different diffraction patterns for the two when unstretched; while Hauser has found them to be the same when stretched. Von Susich⁵ has recently done much to clarify the problem. He reaches the conclusion, as a result of x-ray diffraction data, that gutta percha and balata are identical, and that the substance exists in two different crystalline modifications, the alpha form being stable below about 60° C. and changing to the beta form when heated above this temperature. Of course, this at once explains Hauser's results, since the specimens were doubtless heated above 60° C. when stretched and would then show the beta pattern.

Independent data have been obtained in this laboratory which, in the main, confirm the finding of von Susich and also help to explain further some of the discrepancies which have existed and do exist in the x-ray data for these two substances.

Several specimens of gutta percha and balata have been examined. Debye-Scherrer patterns, using molybdenum radiation, have been obtained for all of them, and pinhole patterns, using copper radiation, have been obtained for some of them. It was suspected that the disagreement among the several investigators might be due to the fact that the materials examined were from different sources. The data presented herewith are for the following samples: Peruvian block balata, Surinam balata (smoked sheet), deresinated balata (source unknown), and Macassar gutta percha. (Von Susich⁵ showed that it is not necessary to use purified gutta hydrocarbon. The same diffraction patterns are obtained for the pure and impure material, indicating that the diffraction pattern is that of the gutta hydrocarbon.) The diffraction patterns for these, together with those obtained by von Susich for α - and β -gutta percha, are recorded in Table I.

Before von Susich's work appeared, it had been suspected that gutta percha was a mixture of balata and another crystalline constituent. This conclusion is supported by two facts:

1. The balata pattern is to be found almost complete in the gutta percha pattern, the position of the lines corresponding to within the experimental error with one, and possibly two, exceptions. The spacing of balata, which is noticeably different on the gutta percha pattern, is the line 4.73-4.75 Å. which occurs at 4.56-4.68 Å. on the gutta percha pattern. The fact that this line varies on the gutta percha pattern tends to minimize the lack of agreement of this value with line 4.73-4.75 Å. on the balata pattern. The agreement seems to be more than a coincidence and is therefore suggestive of the interpretation which has been made above; but since the lines are not in perfect agreement, the evidence is not necessarily conclusive.

2. Patterns of an intermediate nature were frequently obtained, both for natural gutta percha and in isolating chicle gutta⁵ in which the intensity of the balata lines varied, indicating a variation of the concentration of balata in the whole gum.

The results of von Susich⁵ throw a somewhat different light on the data of the present writers. It is evident that their gutta percha pattern agrees very well with von Susich's pattern for α -gutta percha; while the pattern they have always associated with balata is the pattern of his β -gutta percha. The data are in satisfactory quantitative agreement, with two exceptions. The largest spacing for α -gutta percha is too large to be found on the Debye-Scherrer diagram and has been obtained from the pinhole diagram; and it is evident that in von Susich's pattern and that of the writers the diffraction ring from which the value was calculated is so diffuse that no great accuracy can be expected. The value 4.56 Å. for α -gutta percha is not very close to the present writers' corresponding value.

Von Susich states that β -gutta percha may be converted into α -gutta percha, the low-temperature form, by dissolving it and reprecipitating below 60° C. The specimens of deresinated balata and Peruvian block balata were dissolved in benzene, and the benzene was allowed to evaporate spontaneously. Each residue produced the pattern recorded in columns 9 and 10 of Table I, the typical pattern for gutta percha.

We may still explain all the data at hand by assuming

¹Publication permitted by *Ind. Eng. Chem.* Presented before the Division of Rubber Chemistry at the 81st meeting of the A. C. S., Indianapolis, Ind., Mar. 30 to Apr. 3, 1931.

²Department of Chemistry, University of Illinois, Urbana, Ill.

³Clark, G. L., *Ind. Eng. Chem.*, 18, 1131 (1926).

⁴Hauser, E. A., *Kautschuk*, 3, 228 (1927).

⁵Stillwell, *Ind. Eng. Chem.*, 23, 706 (1931).

⁶Hopff, H., and von Susich, G., *Ibid.*, 6, 234 (1930).

TABLE 1. COMPARISON OF X-RAY DIFFRACTION DATA FOR GUTTA PERCHA AND BALATA WITH DATA OF VON SUSICH FOR α - AND β -GUTTA PERCHA

Surinam		Peruvian Block		Deresinate		Macassar Gutta Percha		Residue from Benzene Extraction		α -Gutta Percha		β -Gutta Percha	
<i>d</i> (Å.)	<i>I</i>	<i>d</i> (Å.)	<i>I</i>	<i>d</i> (Å.)	<i>I</i>	<i>d</i> (Å.)	<i>I</i>	<i>d</i> (Å.)	<i>I</i>	<i>d</i> (Å.)	<i>I</i>	<i>d</i> (Å.)	<i>I</i>
4.97	vs					10.35	w			12.2	vw		
						4.97	s	4.97	vs	4.96	vs		
4.63	m	4.75	s	4.75	s	4.68	m	4.63	m	4.56	s	4.73	vs
4.07	m							4.07	m				
3.93	s	3.93	s	3.92	s	3.92	s	3.94	s	3.94	s	3.89	s
3.33	s					3.33	m	3.35	s	3.32	s	3.29	vw
2.94	m	2.94	w	2.96	m	2.95	m	2.94	m	2.98	w	2.95	m
		2.78	w	2.78	m							2.77	w
2.72	m					2.73	w	2.72	m	2.74	w		
		2.38	w	2.39	w	2.38	w						

that the gutta percha is a mixture of balata and another crystalline constituent, provided it is assumed that at the so-called transition temperature the second crystalline phase is dispersed in the balata and held in the amorphous state so finely divided that it produces no diffraction pattern. It seems very probable that this is exactly what happens to chicle gutta when chicle is refined. This explanation is favored by the fact that the transformation is not easily reversible. Von Susich finds that the low-temperature condition cannot be set up again by simply cooling the gutta percha, but it must be dissolved and reprecipitated below 60° C. If a second crystalline phase were dispersed as the temperature was raised, this would not easily coagulate again when the temperature was lowered; but if the gum were dissolved and allowed to recrystallize, one would expect the two crystalline phases to develop and give their characteristic patterns.

Regardless of whether we are dealing with two forms of gutta percha or with a mixture of balata and another substance, the important facts of the case have been admirably set forth by von Susich. The significant difference in the present writer's interpretation depends on the suggestive, if not conclusive, evidence that the pattern for balata is to be found in the gutta percha pattern, indicating that the gutta percha is a mixture of balata, as such, and another crystalline form. Von Susich did not consider the possibility of a mixture. Based on his own interpretation, it would mean

that his so-called α -gutta percha is really a mixture of β -gutta percha and another constituent.

It has been definitely shown that gutta percha and balata give identical diffraction patterns at room temperature in some cases; that when the patterns at room temperature differ, the gutta percha may be heated above 60° C. and will then give the characteristic balata (or β -gutta percha) pattern; or the balata may be dissolved and reprecipitated below 60° C. to give the characteristic gutta percha pattern. The fact remains, however, that for two of the three samples examined which are known commercially as balata, as well as for balata samples previously examined by Clark and Hauser, the diffraction pattern differs from that of samples of gutta percha. Of course only a limited number of specimens have been examined and it would be well to consider a greater number of so-called balata specimens. If the diffraction patterns differ from that of gutta percha in a majority of cases, this difference would be of practical significance as a means of classification. Obviously the discovery that one form may be converted into the other at will does not lessen the difference between the two forms although it does explain this difference. It simply means that the product which is generally known commercially as balata is a gum, originally identical with gutta percha, which has at some time, either when first coagulated or later, been subjected to a temperature above 60° C. and had its crystal structure and other physical properties changed thereby.

Wasted Energy and Materials

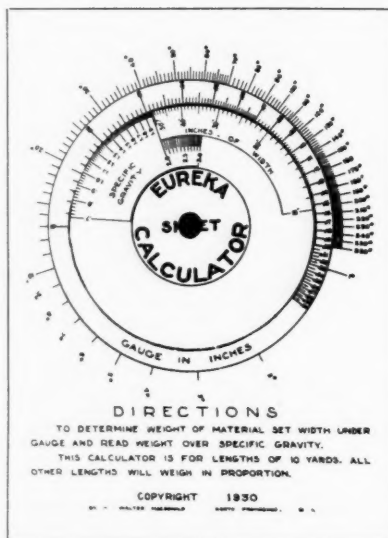
A Method for Determining the Weight of Sheet Materials

ONE of the greatest contributors to the column of red figures in many manufacturing plants is the wasted energy and materials caused by producing either excess or insufficient material when filling an order.

A foreman usually has approximate figures which tell him roughly how much material is necessary for an order; then to "play safe" he adds a few pounds more. The result is often an excess of mixed material which, together with the labor required to produce it, is either a partial or total loss unless the finished article is standard and can be stored as finished goods without deterioration or change in physical dimensions.

On the other hand if not enough material is prepared, further scheduling is required, this practice not only interferes with the regular program but increases the percentage of raw scrap; requires additional "set-up" time for equipment, thereby reducing its hourly output; and causes confusion and delays which may result in broken promises of shipment.

The purchaser cannot be charged for these errors, and the manufacturer must stand the loss or figure his overhead high enough to take care of such conditions. The cost estimator is very often placed at a great disadvantage when overhead is added to his price even though his estimates for actual labor and material are exceptionally conservative. It is obvious that this condition should be



Calculator for Sheet Materials

controlled at the beginning of the process instead of at the point where stock passes from the semi-finishing to the finishing operations.

This, however, is rather laborious unless the foreman or the scheduling department has been able to devise some form of calculating chart or device which will show the correct amount of materials to prepare. Such a device should be accurate; adjustable for different materials or changes in physical dimensions; simple to operate and understand; and of a size to carry in one's pocket if desired.

The calculator illustrated in the accompanying picture was developed for determining the weight of materials in sheet form. The graduations and the relation of one scale to another are so arranged that, knowing the width and the thickness of the sheet to be made, together with the specific gravity of the material, it is possible to determine the weight of material

necessary. This is done by rotating the center dial until the width of the desired sheet is directly opposite the desired thickness or gage and reading the figure in the outer circle, which is directly opposite the figure corresponding to the specific gravity of the material being made.

It will be well for every manufacturer and foreman to observe these conditions in his own plant and determine how much wasted energy and material occurs during a year, which might be saved.

Rubber Grinding Wheels

Joseph Rossman, Ph. D.

GRINDING wheels are made by uniting grains of abrasive, such as crushed crystalline alumina or silicon carbide, with a bonding material. The particular bonding material used depends to a large extent upon the type of grinding operation in which the grinding wheel is to be employed. Thus, the abrasive grains may be bonded by such materials as a vitrified ceramic material, shellac, synthetic resins, or by vulcanized rubber. Each of these types of abrasive wheels has its own particular field of utility, and each is better adapted to use in that particular field than any of the other types.

Abrasive wheels produced by uniting abrasive grains with a bond of vulcanized rubber have been found particularly useful in grinding operations which require extremely high peripheral velocities. It has been known that hard rubber gives the best results, on account of its elasticity and strength, which enables the wheel to withstand side pressure or sudden shocks to a far greater extent than can wheels or articles made with a vitreous bond.

An ideal rubber bonded wheel should be strong, resist side pressure, be relatively open-textured and free cutting, and should so retain the grains as to permit them to function at least until dulled by actual work performed.

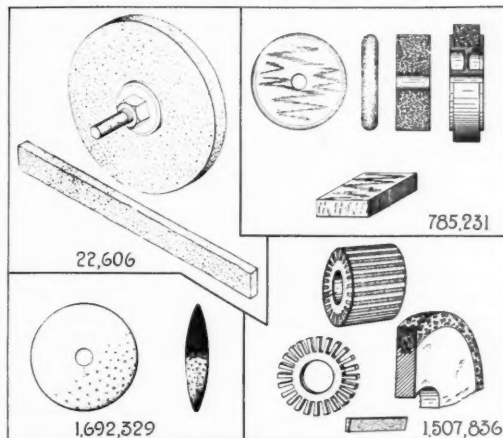
Rubber grinding wheels, sharpening stones, and other abrasive and polishing instruments are made from abrasive and polishing materials such as crystalline alumina, silicon carbide, corundum, emery, and the like, mixed with rubber and sulphur. The usual methods of making these articles involve either mixing the abrasive material with the rubber and sulphur by the use of mixing or calender rolls, or by softening the rubber with gasoline, naphtha, or some other solvent, and mixing with abrasive material in a mixing machine.

Old Methods

According to the older methods used for making grinding tools, sulphur is first mechanically worked into a rubber bond, and the mass is rolled with a quantity of abrasive grains to embed the latter uniformly in the rubber. The mass is then compressed in a press heated by steam, for a period of 2 to 4 hours before vulcanization. The partial vulcanization is necessary to prevent the wheel from swelling, cracking, or otherwise becoming defective during the final vulcanization process. As a result the process has been slow, expensive, and difficult to carry out. In fact it has been generally impossible to obtain uniform vulcanization or to carry on the process to completion. The products, consequently, have varied in their physical nature, and many of the wheels have been found defective.

Use of Accelerators

In order to obviate these difficulties C. R. King proposed



in his U. S. patent 1,394,500, Oct. 18, 1920, the following method: The crude rubber, the sulphur, and an accelerator, which may be para-nitrosodimethyl-anilin or its salts, are mixed together and abrasive grains are intimately incorporated in the mass on mixing rolls. When the material has been sufficiently mixed and it has been rolled out into strips of uniform thickness, it may then be cut into disk form to correspond with the size of the wheel to be made. For a thin wheel the disks are made up in a single layer considerably thicker than the final size, but if a thick wheel is to be made, a plurality of strips are piled one

on top of the other to build up the wheel. These disks are then placed in an iron mold having plates adapted to fit closely but movably within the mold whereby the mass may be compressed to the desired thickness.

Abrasive Articles from Latex

It has been found that the necessity for passing the abrasive and rubber mixture repeatedly through mixing and calender rolls crushes the grains to a much finer size than that originally selected. This change may involve a serious disadvantage in cases where it is desired that the grains be of a large coarse size. There is also a very definite limit to the amount of abrasive material that can be mixed with a given amount of rubber on such mixing rolls; so the grinding wheels thus made often contain a larger portion of rubber than is desired.

The use of solvents, such as gasoline or naphtha, has been found to be expensive as well as to involve considerable fire hazard. These solvents, moreover, are difficult to remove from the rubber and so affect detrimentally the hardness of the abrasive article. Furthermore it has not been feasible heretofore, by using the ordinary methods of wheel manufacture, to make a rubber bonded wheel which has a porous and open structure or other desired abrading characteristics.

One solution for this problem is given by Webster in U. S. patent 1,687,410, Oct. 9, 1928, by mixing rubber latex with the abrasive grains of selected sizes and then placing the mixture in a mold. As a specific example of a method of making a grinding wheel the following ingredients in the proportions specified are used:

Silicon carbide abrasive grains.....	60 lbs.
Rubber latex	20 lbs.
Sulphur	4 lbs.
Hexamethylenetetramine	½ oz.

The abrasive grains selected may be of any suitable size and are mixed with the other materials in a mixing machine until the latex and the sulphur are thoroughly distributed throughout the mass of abrasive grains. Thereafter a solution of zinc acetate or other suitable coagulant is added slowly, while the mass is being mixed, until the latex as-

sumes a rubbery, cheese-like consistency. This mixture is then placed into a mold and is pressed to the desired shape. For this purpose the material may be heated and pressed hot; after this procedure the shaped article is vulcanized by any well known method.

Westcott in U. S. patent 1,668,439, May 1, 1928, makes a silicon carbide wheel bonded with rubber carrying an asbestos reinforcement as follows: 1,000 parts of granular abrasive, which may be in one or two sizes, are mixed with 25 parts of good commercial asbestos and 100 parts of sulphur; the mixing may be either dry or wet. In the latter event about 200 parts of water may be used. The quantity of sulphur indicated is for making a hard cured final product. Where a less degree of cure is wanted, the quantity of sulphur is reduced to less than 50 parts. This mixture is next formed into a dough with diluted latex, containing a protective colloid to prevent coagulation occurring during incorporation. The asbestos aids in causing uniform distribution by a sort of wick action; moreover it holds the latex in place during drying. The best protective colloid for this purpose is hemoglobin. For the quantities and the materials so far specified there is used 100 parts of rubber which can be furnished by 300 parts by weight of commercial 30 per cent latex, dissolving in it 25 parts (dry basis) hemoglobin. The dough is shaped into the desired article in any convenient way: it may be extruded as rods, rolled into sheets, etc. The molded article next is dried at a low temperature; the drying is best done in vacuo at a shelf temperature, toward the end of the drying, not exceeding 150 degrees F. Under these conditions the water evaporates, leaving a porous article of the proper shape containing films of gelled rubber. This article is compacted under heavy pressure while still warm, giving the final shape and dimensions desired. Under pressure the clean cellular rubber surfaces weld together. The article is now vulcanized, using the ordinary means and methods. Where the initial shape is a rod or tube, disks or wheels may be cut from it at any stage in the described operation; the same is true of sheets. Cutting after drying and before compaction is generally best.

In U. S. patent 1,668,475, May 1, 1928, Westcott adds relatively long fibers to the latex, which increase the tensile strength of the article.

Bakelite and Rubber Binder

In using rubber grinding wheels considerable heat is developed which tends to soften the rubber and weaken the bond so that the abrasive grains are readily separated. It has been discovered according to Webster, U. S. patent 1,655,396, Jan. 3, 1928, that the addition of synthetic resins to the rubber bond may modify the properties of the bond to render it more resistant to heat changes. As an example of a grinding wheel made in accordance with this invention, Bakelite is combined with rubber, sulphur, and abrasive in the following proportions:

	Parts by Weight
Rubber	9.75
Sulphur	5.25
Synthetic resin (Bakelite).....	1.00
Abrasive grains (of desired size).....	112.00

The raw rubber is repeatedly passed between mixing rolls; and small increments of the required amount of sulphur, abrasive grains, and synthetic resin, in the form of a powder of flour, are added at desired intervals, whereby an intimate mixture of the abrasive grains, sulphur and synthetic resin is produced. The mixture is then rolled out into sheets of a desired thickness depending upon the thickness of the grinding wheel, or other abrasive article, being made and is cut to the size and form desired. The article thus formed is placed in a mold and vulcanized.

Abstracts

The following abstracts give a review of the United States patents granted for manufacturing rubber grinding articles.

1. Mayall, 22,606. Jan. 11, 1859. An emery wheel is made from the following mix: one pound rubber, five ounces sulphur, five pounds emery, and one ounce olive oil. The olive oil renders the product more elastic and tough. (See group illustration.)

2. Mayall, 24,039. May 17, 1859. The rubber in the prior patent is replaced by gutta percha in order to give a flexible product.

3. Mayall, 25,747. Oct. 11, 1859. Fifteen pounds of emery are used to one pound of rubber and five ounces of sulphur for making abrasive articles.

4. Mayall, 125,600. Apr. 9, 1872. Prepare emery hard-rubber compound used in the manufacture of wheels, by first dissolving the sulphur and rubber in naphtha and then mixing emery with the solution.

5. Harper, 238,502. Mar. 8, 1881. An abrasive composition consists of emery, twelve parts; rubber, twelve parts; sulphur, twelve parts.

6. Call, 266,346. Oct. 24, 1882. The process of forming dental abrading disks consists of producing a corrugated surface upon a vulcanized disk of rubber and corundum, oxidizing the surface of a steel disk and cementing the two roughened surfaces together.

7. Halsey, 426,994. Apr. 29, 1890. A polishing wheel for dentists' use consists of equal parts, by weight, of granulated cork and rubber thoroughly mixed, molded into the desired shape, and vulcanized.

8. Pritschau, 574,449. Jan. 5, 1897. Abrasive polishing and scouring material consists of an ordinary sponge combined and filled with a mixture of rubber, sulphur and an abrasive powder, vulcanized.

9. Hull, 783,959. Feb. 28, 1905. Vulcanized dental separating disk, composed of granular abrasive material, has a side surface smooth and non-abrasive.

10. Roberts, 785,231. Mar. 21, 1905. A polishing or abrading tool consists of rubber, sulphur, lime, emery, hair, rouge, and zinc sulphite. The hair serves to bind the mass together as well as to burnish the article worked upon. (See group illustration.)

11. Slager, 799,200. Sept. 12, 1905. A composition for polishing wheels, comprising rubber, an abrasive material, and a fibrous material, such as woolen fibers in a finely comminuted condition, is thoroughly intermixed, molded, and vulcanized.

12. Pfanstiehl, 1,210,358. Dec. 26, 1916. The process consists in mixing rubber, sulphur, and granules of alumina forming the mixture into an annular disk of uniform thickness, and coating the surfaces of the disk with a mixture of sodium silicate and a granular abrasive.

13. Burlew, 1,238,883. Sept. 4, 1917. A dental tool for cleaning teeth is formed of soft vulcanized rubber and polishing material which furs or tears in use.

14. King, 1,394,500. Oct. 18, 1921. The method of making abrading tools comprises mixing sulphur, an accelerator, and abrasive grains with rubber while heating the rubber to render it more plastic, subjecting the mass to high pressure for a few minutes to shape the tool, and thereafter vulcanizing the bond for several hours in a single heat treatment.

15. King, 1,507,836. Sept. 9, 1924. An abrasive wheel comprises a resilient rubber center portion, a plurality of spaced teeth of rubber bonded abrasive grains supported thereby, and webs of resilient rubber separating and uniting the teeth with said center portion; the webs and the teeth have a common continuous surface. (See group illustration.)

16. Webster, 1,655,396. Jan. 3, 1928. An abrasive ar-

ticle is made from a mixture of abrasive grains, sulphur, rubber, and a synthetic resin.

17. Wescott 1,668,439. May 1, 1928. An abrasive article made from abrasive particles is bonded together by latex, asbestos fiber, and hemoglobin.

18. Wescott, 1,668,475. May 1, 1928. An abrasive article of hard rubber contains abrasive grains and distributed relatively long cotton fiber in random arrangement throughout the hard rubber. The bonding rubber is derived from latex gelled *in situ*; this rubber constitutes about 10 per cent of the whole article.

19. Westcott, 1,668,476. May 1, 1928. An abrasive wheel comprises a central reinforcing layer of fabric and lateral faces composed of abrasive grains carrying a coating of intermediate binder and bonded with rubber derived in part from gelled latex; the rubber contains reinforcing fiber in random arrangement.

20. Johanson and Webster, 1,676,190. July 3, 1928. A grinding wheel comprising abrasive grains incorporated in a vulcanized rubber bond contains from about $\frac{1}{8}$ -ounce to about 3 ounces of beeswax per pound of bond.

21. Webster, 1,681,891. Aug. 21, 1928. Abrasive articles are made from the following ingredients:

	Per Cent by Weight
Rubber latex	18.3
Sulphur	3.5
Abrasive	69.0
2½ solution of rubber in solvents naphtha	9.1

22. Webster, 1,687,410. Oct. 9, 1928. Abrasive grains are bonded together by means of latex, sulphur, and an accelerator.

23. Burlew, 1,692,329. Nov. 20, 1928. A grinding wheel has an abrasive substance in powdered form, chopped sponge, and a binder of rubber vulcanized with the abrasive and sponge. (See group illustration.)

24. Biddle, 1,764,928. June 17, 1930. Grinding wheels are made from the following formula:

	Parts by Weight
Rubber latex (35% rubber content)	100
Bentonite clay	2
Zinc oxide	2
Sulphur	3
Water	5
Granulated carborundum	50

The clay, zinc oxide, and sulphur are first mixed with the water to form a paste; the latex is then added and the mass mixed, following which the carborundum is added; the plastic composition so formed is then molded into wheels or stones.

Motor Bus Impact Reactions

(Continued from page 55)

reactions are extreme and unusual and, in general, the artificial obstructions used in these tests are more severe than natural obstructions commonly occurring on the highway.

6. For a given cross-section of tire, either in the balloon or high-pressure type, variation in rim diameter from 20 to 24 inches has but slight influence on the magnitude of the impact reaction provided the same inflation pressure is used in each case. If standard, recommended inflation pressures are used, then the larger diameter tire causes a lower impact reaction because of the lower inflation pressure which it carries.

7. A change in rim width from 7 to 8 inches causes no appreciable change in the impact reactions of a 9.00 by 20-inch tire, the same inflation pressure being used in each case.

8. At a given inflation pressure the variation in load from capacity to 50 per cent overload has comparatively

little influence on the magnitude of the impact reactions as the load is increased.

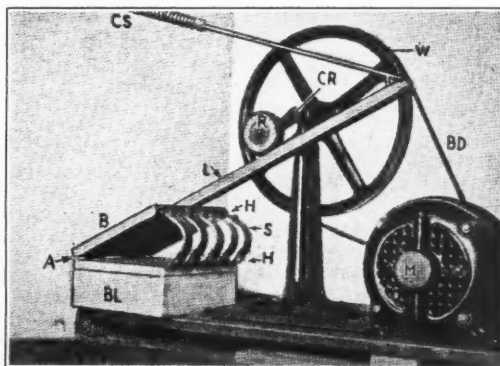
9. For a given type, single tires cause lower reactions than dual tires whose combined capacity is equal to that obtained, expressed in force units. Expressed, however, as a percentage of the static load, the values obtained decrease of the single.

Sole Flexing Tester



THE ability of vulcanized soles to endure flexing without cracking is an important measure of service quality. A machine for testing rubber soles in respect to flexing quality has recently been developed.¹ The test piece pictured in Figure 1 shows the degree to which it is flexed on the machine illustrated in Figure 2. The specimens for test shown at S are cut 5 inches by Test Piece 1 inch, and both ends punched with two screw holes for attachment to the narrow hinges. One hinge H is permanently screwed to the hinged board B, and the other permanently screwed to the fixed block BL. The board B is hinged at A, and permanently fixed to it is the lever L.

The apparatus is run by an electric motor, the small pulley M of which drives the wheel W by the band BD, thereby reducing the speed. The roller R is attached to the end of the crank CR and depresses the lever L as the wheel W re-



Bull. Rubber Growers' Ass'n.

Fig. 2. Flexing Tester

volves. A compensating spring CS causes the lever to return and follow the roller R, which is rubber treaded. In this way a smooth up and down movement of the board B is produced, which alternatively flexes and straightens out the test pieces S. It may be noted that the specimens are always flexed in the same direction, outwards. The angle of flexing can, of course, be altered by adjusting the position of BL nearer or farther away from the crank. The rate of flexing was adjusted to 15,000 flexes and returns per hour. It was not practicable to run at a slower rate since some of the higher grade solings were found to outlast over five million flexes.

The flexing of solings in this machine does not always break them down in the same way, but generally slight cracking at the edges precedes extensive cracking which, in the case of poorer qualities ultimately terminates in complete rupture. In one sample the resultant splitting was actually longitudinal, but cracking and rupture always occurs in the center part of the test piece and remote from the grips.

¹"The Flexibility of Rubber." By Henry P. Stevens, Bull. Rubber Growers' Ass'n., Apr., 1931, pp. 172-75.

A Good Samaritan Speaks

Rubber Goods in the Hospital

I AM Rubber in its most humane guise.
I am Hospital Supplies.

In my many and varied forms—from the smallest pessary to the largest operating pad—I offer protection to all with whom I come in contact; I make more comfortable the invalid; I alleviate the pain of the suffering; I help save many lives.

Through long, slender tubes I feed the hungry, or drain away impurities.

By ice-packed bags I cool the feverish brow; I sooth the swollen throat or aching spine.

As elbow, heel, and seat cushions, as pillows and mattresses, I ease the bedridden.

I envelop the surgeon in an apron to guard him and his patients. For greater security I gently glove his hands.

On soles and heels of shoes, on tables, chairs, and beds, on the bottom of buckets, on floors and walls, I bring peace and quiet.

My uses are many, my powers unlimited.

I am Hospital Supplies.

Innumerable types of rubber hospital supplies are offered in several sizes, shapes, and colors to fulfill every need. Sponge rubber, moreover, is being recognized as extremely useful in this field and already has made its appearance in different items.

Invalid cushions are either of sponge rubber or rubber coated sheeting easily inflated. The former construction reveals many interesting features. No possibility exists of

puncture or deflation. Nor are there any metal parts, bindings, or seams. Such a cushion offers also a smooth sanitary surface, brown in color, with diameters 14 and 16 inches.

The inflated cushion likewise serves many useful purposes. An all rubber model is molded in one piece without seams and comes in four sizes: child's, 12-inch diameter; small, 14 inches; medium, 16; and large, 18 inches. Another type of cushion is made in two sections to facilitate inflation and has cloth insertion. Of maroon rubber it is available in 10-, 12-, 14-, 16-, 18-, and 20-inch diameters. When inflated, some cloth inserted cushions with a 12-inch diameter open $4\frac{1}{4}$ inches; 14, $5\frac{1}{2}$ inches; 16, $6\frac{1}{2}$ inches; and 18, 8 inches. The all rubber inflated model comes in 14-, 16-, and 18-inch sizes. An improved type, self-ventilating, may be had, with a 15- or 17-inch diameter.

Sponge rubber is used also for pessaries, offering a smooth non-absorbent surface. The color is white. Or, if preferred, inflated red rubber pessaries are available. So, too, are solid rings. The range of sizes for round pessaries is from $2\frac{1}{4}$ to $3\frac{3}{4}$ inches wide. Hard rubber pessaries and those of irregular shape are offered in sizes from $2\frac{3}{4}$ by $1\frac{3}{8}$ inches to $3\frac{7}{8}$ by $2\frac{9}{16}$ inches.

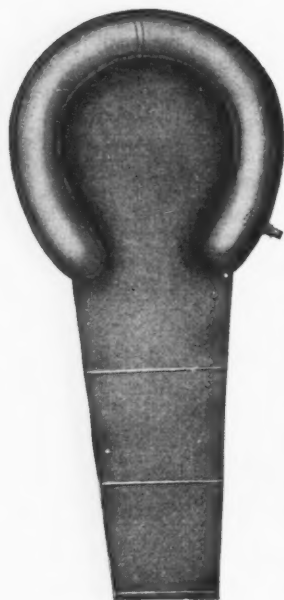
Hospital sheeting, in maroon, white, or black, comes in medium or heavy weight. Squares, single or double coated, are 36 by 36 or 45 by 45 inches. Sheeting also is made in six-yard lengths 36, 45, and 54 inches wide, or may be had in 12-, 25-, and 50-yard rolls.

Catheters, of red rubber tubing 16 inches long, have one end funnel shaped and an eye at the other end. Catheters appear in even sizes from 8 to 28, French scale.

Stomach tubes also are important. The plain tube may be had, as well as one with a funnel at one end. A more complete set has a bulb too, partway



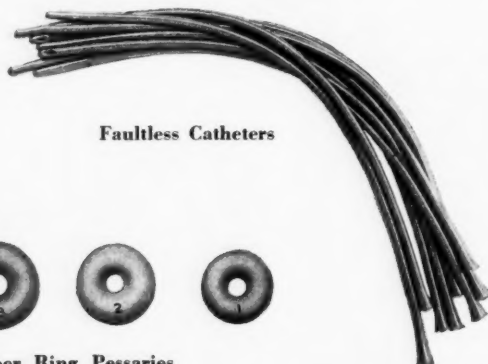
United States
Rubber Sur-
geon's Apron



U. S. Rubber
Operating Cushion



Davol Tonsillectomy Bag



Faultless Catheters



Faultless Sponge Rubber Ring Pessaries



United States Rubber
Air Cushion

down the tubing. The latter, of red rubber 60 inches long, has an eye on one side. Two eyes, however, may be secured if so specified. Sizes of stomach tubes are 22, 28, 30, and 32, French scale.

Among the variety of syringes is one for surgeon's use. It is of tan rubber, oval shaped. Besides the length of tubing with necessary metal parts, is a neat case.

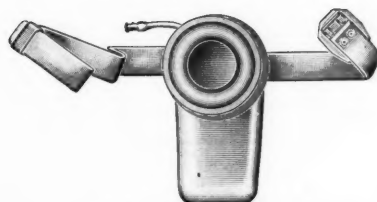
Colostomy pouches come in several styles with a $7\frac{1}{2}$ - or 14-ounce capacity. One number includes tan rubber pouch, supporting frame, and waistbelt.

Operating cushions prove blessings in disguise. As a rule they are reversible, of maroon rubber with cloth insertion, and metal stays in the apron to permit shaping. Pure gum operating cushions also are on the market. Regular Kelly pads have an apron length of 25 inches and an outside diameter of 20, 24, or 44 inches. Or this pad may be had in sizes 20 by 44 or 24 by 44 inches. Modified inflated ends likewise are available. Instead of a circular shape, as on the Kelly cushion, one model has square corners. Its size is 20 by 44 or 24 by 44 inches. Rounded corners appear on an operating cushion 23 by 44 inches.

Ice caps usually are molded in one piece with no seams or bindings. They are either all rubber, generally maroon in color, or rubber with cloth insertion. Round caps, frequently 9 inches in diameter, bear four tabs for convenient tying. Certain ice caps, round in shape and of diameters 6, 8, 9, and 12 inches, have no tabs but are merely rested in the aching member. Oval shaped caps, some 7 by 11, others 8 by 11 inches, carry two tabs. The screw caps on these relief bringers are designed to prevent leakage; while some models have unlosable chain attachments.

Like the caps, ice bags are molded in one piece with specially designed screw caps. These bags, however, suit a wider variety of purposes and, in consequence, assume several shapes. For the spinal column are ice bags 18 inches long, of red rubber with two tabs having reenforced holes for tape. Another spinal bag is made 14 by $3\frac{1}{2}$ inches with tabs for tape.

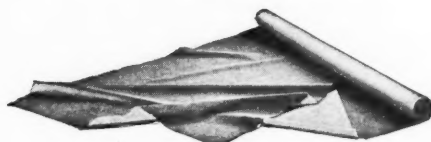
Ice bags for throats have many forms. Oblong shapes with tying tape are fashioned 9, 11, and 14 inches long. Others are 12 by 4 inches. A molded oblong is 12 by 3 inches and sports tape and the necessary tabs. A vulcanized oblong model with a clamped lock on



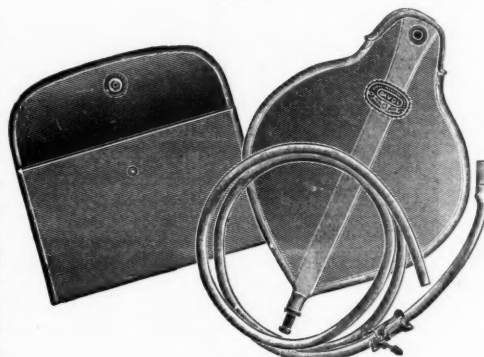
Davol Colostomy Pouch



Faultless Sponge Rubber Invalid Cushion



U. S. Rubber Calendered Hospital Sheet



Davol Surgeon's Syringe



U. S. Rubber Peerless Stomach Tube with Funnel

one end but no facilities for tying is made $10\frac{3}{4}$ by $3\frac{3}{8}$ or $11\frac{1}{8}$ by $5\frac{3}{4}$ inches. Oblong bags curved to fit the neck come 12 inches long. They are furnished with loops for tape tying or with adjustable fasteners on a rubber strap. Flexible throat and tonsillectomy bags specially designed also are available. Some ice bags have cloth insertions. Others have special wire springs on the outside to hold the ice firmly against the patient's throat. Ice bags appear in the following colors: pure gum, red, maroon, and chocolate.

The surgeon welcomes the cover-all apron. Coated cloth, maroon hued models come 45 and 49 inches long; while all-rubber aprons in tan or white are 44 inches.

As silence is essential in the sick-room, various means have been employed to eliminate noise. A recent development is the pail silencer of white or black rubber with grips to fit all pails. It is shaped to go over the bottom of the bucket and has rubber rolls that slip on either end of the handle to prevent it from clanging against the pail. These silencers are easily adjusted and flexible in composition. Incidentally they lengthen the life of the pail.

Another innovation in hospital goods is a self-inflating device providing a new way of inflating drainage pads and cushion rings without using an outside bulb or pump. The bulb on the inside of the cushion facilitates inflation so that it can be effected in a sanitary fashion by the convalescent himself. Thus infection or contamination from using lung power or other unsanitary methods is entirely avoided.

Another development is the use of rubber latex said to impart superior aging and toughness to rubber sundries such as gloves. Latex gloves are produced by repeatedly coating hand-shaped forms, uncovered or carrying net or twill for lining, with prepared latex. The latter is coagulated between dipplings, and the final product thoroughly washed. The linings make the gloves not only easy to wear but save time in putting on and removal. Latex finger cots lack the usual roll at the bottom, rolling being regarded as unnecessary because of the inherent strength and tear resistance of the material.

Scores of other hospital supplies also merit attention, but space does not permit a more detailed description. In closing, therefore, let us pause for tribute to rubber in a most important form—hospital supplies.

EDITORIALS

Give-and-Take Wage Policy

TAKING exception to a lower wage scale which some rubber and other manufacturers have deemed unavoidable at this time, labor leaders are urging resistance to any move that may even moderately lessen pay. It is plausibly contended that reductions would now be uneconomic by tending to impair buying power, but much less convincing is the claim that reductions would not only retard the return of prosperity but lead to continuous unemployment. It is regrettable that those leaders should ever regard pay scales as immutable as Medo-Persian laws especially with regard to minimum allowance, and that they should deem even a suggestion of compromise a grave offense. And yet employers must give and take continually in marketing in order that employment may even be possible.

Widespread, steady employment at fair pay is obviously of more advantage to workers generally than part-time occupation at fixed wage scales out of line with universal economic conditions. It has been pointed out by Mr. Ray Bill in a statesmanlike survey of national business in *Sales Management* that the reason the building industry, for instance, lags so much behind its high record of recent years is not because of any dissension between labor and capital—which perhaps were never in better accord—but because of a too complacent attitude on the part of both.

"The effort to maintain wages at the level of inflated business in this and some other fields," he says, "is keeping more deserving men out of work than it is giving employment to." Even such concord "cannot defeat the law of supply and demand and the reduced cost of living."

"A substantial revival in building, for example, can do more to revive general prosperity than we have a right to expect from our other giant-sized industries at this time. A moderate voluntary reduction in the building trades will do much to speed up the revival of building. There will be more men at work and the aggregate payroll, in spite of a slight reduction in the dollar rate of pay, will be much greater."

Much the same line of argument may be applied to a considerable part of the rubber industry, which also bears intimate relations with the building trades.

Scouts Soviet Oil Rubber

WITH many others Thomas A. Edison ridicules the report that the Leningrad Rubber Trust factory has produced half a ton of commercial rubber from oil (presumably petroleum) by a secret process and that rubber articles are being manufactured from the material. He does not believe that a good rubber can be obtained from oil and advises the Soviets to stick to

guayule if they would hope to supplant or supplement plantation Hevea. Nor is he very enthusiastic about the much-vaunted Russian chondrilla product.

As to oil rubber, it is of course an actuality, but in cost and quality it ill compares with Brazilian or Far East crude. A sample of such a synthetic product attracted much interest, more or less academic, at the recent Chemical Exposition in New York City. It is well known that in the pyrolysis or cracking of high-boiling petroleum to produce gasoline or other low-boiling fractions there are obtained various gaseous hydrocarbons of the olefin series, such as ethylene, propylene, butene, and butadiene. By making the oil run such a gamut a substance can finally be procured which, when suitably condensed, will be virtually synthetic rubber. Even though it be yet imperfect and unprofitable, it is nevertheless a notable chemical triumph.

Why Not Rubber Flooring?

LOW prices may not have resulted in many hoped-for new uses for crude rubber, but they surely have led to the more extensive use of old rubber, not the least being in a field the surface of which has been merely scratched—rubber flooring. For one novel type of the latter, scrap inner tubes are being used exclusively, as well they might with tubes at \$40 a ton.

Buying Power Still Here

ONE of the stock claims of the die-hard pessimists is that it is vain to seek more business now because buying power is lacking. Nothing is farther from the truth. It is here just as much as ever it was, and there is more money in the country, but it may take a little more enterprise than usual to stir it into action. For example, while practically every other department store in New York City in 1930 tried to help dullness by retrenching on publicity, one of the leaders increased its advertising outlay over that of 1929 and as a result its sales grossed larger in 1930 than in 1929; while those of rival stores slumped greatly. Its policy for 1931 is still more advertising and proportionate increase in sales.

The same story can be told of many other retail and manufacturing concerns that have refused to join in the lamentations of the faint-hearted. It is not coincidence that firms which increased sales last year chanced to be those that advertised more, but simply cause and effect. It is just what might have been expected of managements that are not only forward-looking, but are keen judges of merchandising conditions, and who know how to rouse the will to buy.

What the Rubber Chemists Are Doing

Effect of Pigmentation on Retraction of Rubber Compounds¹

F. S. Conover²

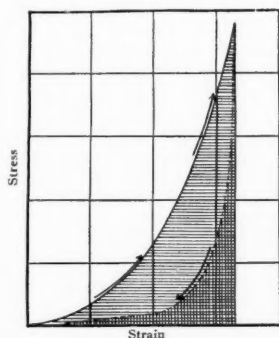


Fig. 1. A Typical Rubber Stress-Strain Extension and Retraction Curve

The entire area between the extension curve (heavy line) and the elongation axis is a measure of the work of extension. The cross-hatched portion between the retraction curve (dotted line) and the elongation axis is a measure of the work of retraction.

THE reinforcement of rubber by pigments has been studied by a number of investigators by considering the effect of pigmentation on the extension stress-strain curves and on the areas enclosed between these curves and the elongation axes, which areas are a measure of the work of extension. (Figure 1) These investigations in conjunction with other data have

¹Presented before the Division of Rubber Chemistry at the 79th meeting of the American Chemical Society, Atlanta, Ga., April 7 to 11, 1930. *Ind. Eng. Chem.*, Aug., 1930, pp. 871-74.

²The New Jersey Zinc Co., Palmerton, Pa.

developed two opinions concerning the mechanism of reinforcement: one, that reinforcement is caused by a bond between the rubber and the pigment particles; the other, that reinforcement is primarily a function of the particle size of the pigment and that the bond is of secondary importance.

The work cited above shows that pigments exert different effects on work of extension, and it has consequently been assumed that they would have somewhat similar effects on work of retraction as measured by the areas enclosed between the retraction curves and the elongation axes. (Figure 1)

The data assembled in this report, however, show that work of retraction from a given elongation is much more independent of the kind or amount of the pigment used. For example, if several pigments and several volume loadings are chosen at random, it will be found that a 5-volume carbon black, a 10-volume Kadox, a 20-volume clay, and a 30-volume XX red zinc oxide stock will all have approximately the same work of retraction from any elongation which is common to all the compounds, although the work of extension to the same elongation for these compounds is quite widely different.

It follows that the retraction curves for two compounds differing only in the kind and the amount of pigment used must cross in returning from the same elongation, as is illustrated in Figure 2. The

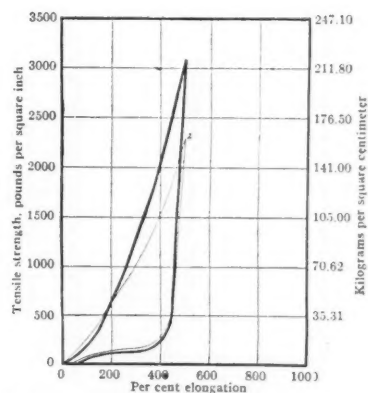


Fig. 2. Crossing of Retraction Curves of Two Compounds, One Containing 20 Volumes of Carbon Black (1), and the Other Containing 20 Volumes of XX Red Zinc Oxide (2)

stiffer the stress-strain curve on extension, the lower is the retraction curve when returning to zero stress. The data further show that work of retraction does depend, in some measure at least, upon quality and condition (state of cure) of the rubber used.

The interpretation of this behavior involves many considerations, and though it undoubtedly has considerable bearing on the theory of reinforcement, any discussion of this aspect of the work will be reserved for a future paper.

A. C. S. Rubber Division Meetings

New York Group

THE New York Group, Rubber Division, A. C. S., held a dinner meeting May 20 at the Building Trades Employers' Club, 2 Park Ave., New York, N. Y. The attendance was about 115, who greatly enjoyed every feature of the occasion. After a social hour spent in the Club lounge an excellent turkey dinner was served in the spacious dining room. Following this "Professor" Baker, a very interesting magician and ventriloquist, entertained the company for a half hour with numerous feats of sleight of hand accompanied by running comment of stories and jokes that kept his

audience in gales of laughter and applause. Two instrumental numbers rendered by Roscoe M. Gage, chemist of the Fisk Rubber Co., were received with hearty approval by the company.

The scientific program was curtailed to a single paper owing to absence by illness of one of the speakers. The paper on "Rubber in the Telephone Industry," by A. R. Kemp, research chemist, Bell Telephone Laboratories, New York, N. Y., outlined the many applications of rubber in telephone construction and operation. The insulation requirements for land wires and submarine cables were described.

Special compounding with washed rub-

ber and selected ingredients is necessary to secure electrical stability of wire and cable insulation particularly with respect to water absorption and swelling which reduce dielectric values. The paper was illustrated by lantern slides exhibiting the influence of the addition of the more common compounding ingredients to typical basic insulating mixings.

Buffalo Meeting

THE eighty-second meeting of the American Chemical Society will be held in Hotel Statler, Buffalo, N. Y., August 31 to September 4, 1931.

Chicago Group

THE Chicago Group, Rubber Division, A. C. S., held its annual meeting May 8, at the Steuben Club, Chicago, Ill. The following were elected officers for 1931-1932: L. J. D. Healy, chairman; W. H. Parker, vice chairman; B. W. Lewis, secretary-treasurer.

Two excellent papers on hard rubber were presented by H. Bluhm and A. H. Voss. The former described the various ingredients used in compounding hard rubber, and their value. He also described the effect of various grades of rubber. The misapprehension that soft rubber containing an excess of sulphur is hard rubber, was cleared up in the discussion of this paper. The best method for adhering hard rubber to metal, and the best lubricant for use in molding hard rubber were also taken up.

The paper by Mr. Voss dealt largely with deteriorating effects on hard rubber with relation to insulating properties. Considerable work is yet to be done in order to improve the dielectric strength of hard rubber. In the discussion following the paper many questions arose concerning the comparative insulating values of hard rubber and the various forms of synthetic resins.

The large attendance was entertained during the dinner hour by the "Moonlight Serenaders." The Chicago Group has made arrangements with the Steuben Club to hold its meetings there in the future. Members who come from points out of Chicago can stay in the Club at regular hotel rates.

Elaborate plans at present are being made for the fall meeting, and those who wish to receive notices should send their name and address to B. W. Lewis, secretary, care Wishnick-Tumpepe, Inc., 365 E. Illinois St., Chicago.

Swelling of Gels

TWO possibilities with regard to the swelling and drying of gels or the taking up and giving up of fluids are advanced and discussed in a recent article by E. L. Lederer¹, who summarizes as follows his study of the theories he examined.

The molecules of fluid move freely, obeying the hydrodynamic laws; the molecule of fluid moves on a pressure gradient opposite to resisting forces. The drying up of non-swelling bodies and also of sols were, therefore, specially studied. The former show qualitatively directly before complete drying, the same phenomena as the latter. The course of sol drying seems to indicate that the fluid is bound in two ways: namely, partly adsorptive, on the external fields of force, of the molecule aggregate, and partly in hollow spaces.

From the value of the permanence coefficient, this must also apply to the rubber sol; therefore, a micellar structure would be ascribable to it. The point of transition in both types of drying seems to lie between gel and coagulum (McBain), and between gel and coagel (Ostwald), respectively.

Effect of Carbon Black on Insulating Oils

W. B. Wiegand¹, C. R. Boggs² and D. W. Kitchin²

THESE authors have recently published an account³ of their experimental study of carbon black on insulating oils. Statement of the problem, outline of experimental methods used, and conclusions are given in the following abstract.

The most satisfactory dielectric available for the insulation of certain types of cables, switches, and transformers is at the present time a specially refined petroleum fraction commonly known as transformer oil. In certain respects, however, the transformer oils are still defective. Under long exposure to elevated temperature certain oxidation products are formed, which are eventually thrown out of solution (sludging), and which cause deterioration of dielectric strength, resistivity, power factor, etc.

Another active cause of deterioration is the presence of traces of moisture. Thus Clark in 1928 showed that 2 parts in 100,000 by volume may lower the dielectric strength sufficiently to destroy the usefulness of the oil.

Previous work by two of the present writers has shown that the addition of small amounts of an active carbon black (such as Micronex) to rubber compounds markedly improves their insulating properties—in particular, the power factor, dielectric strength, and resistivity. This phenomenon is especially remarkable because the expected effect of carbon black is to injure the insulation value of dielectric materials.

It is evident, therefore, that because of its high adsorptive powers the carbon black renders inactive something whose presence is more harmful than that of the required amount of adsorbent. This consideration led to two distinct lines of experiment: the study of the increase in breakdown strength of transformer oil on treatment with carbon black where all or most of the black was removed; the study of the effect of carbon-black additions on the high-frequency power factor of suspensions of moist whitening in highly refined mineral oil. The first study was made on account of its commercial value; the second was undertaken to investigate the mechanism of power factor reduction via carbon black in a medium free from the variables prevailing in rubber compounds.

Conclusions

New transformer oils, when treated either by filtration or by sedimentation with dried carbon black of suitable quality, have shown an average improvement in dielectric strength of 40 per cent. Such treatment has been found more effective than that with metallic sodium, which also tended to darken the oil. Active carbon black tends to remove moisture, electrolytes, and suspended particles. The importance of substantial removal of carbon black after treatment is shown by data on

power factor of various carbon blacks in oil mixtures. The effectiveness of carbon-black treatment of insulating oils is at its maximum at the lower temperatures, thereby avoiding the ill effects of existing high-temperature drying procedures.

The power factor of suspensions of whitening in mineral oil is extremely sensitive to the presence of moisture. Active carbon blacks, such as Micronex, have great avidity for water and moderate amounts of adsorbed water cause only slight power-factor increase in suspensions of them. Active carbon black is able to deprive suspended moist whitening of its water. The transfer of water in a mix from the whitening, where it gives large power factor, to the carbon black, where its effect is negligible, produces a striking decrease in the power factor of the mix. The electrical conductivity of the carbon black particles plays no important role in this effect.

These results show that in insulating compounds such as rubber, where whitening is used as a filler, it is essential to have the whitening as dry as possible. The addition of small amounts of active carbon black tends to reduce the power factor of a compound in which the whitening or other pigment is not absolutely water-free. Pigments other than whitening are less sensitive to moisture in insulating compounds, but the addition of carbon black in small amounts will probably bring about an improvement even then.

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¹ Binney & Smith Co., New York, N. Y.

² Simplex Wire & Cable Co., Boston, Mass.

³ *Ind. Eng. Chem.*, Mar., 1931, pp. 273-76.

¹ *Kolloid-Zeit.*, Apr., 1931, pp. 41-47.

Crepe Content of Latex

TWO new simple methods for determining the dry material content of latex and a rapid method derived therefrom of finding the crepe content are given in the following translation.¹

To find the dry content of Hevea latex 2 gr. of latex are weighed into a nickel pan, 10 cm. (3 inches) diameter and 4 mm. (1.6 inches) high. Carefully spread the latex over the nickel surface and evaporate over a low flame until all white and opaque parts have disappeared. The warm dry film is gathered into a lump and weighed. The whole operation takes from 6 to 10 minutes.

Parallel determinations of dry substance, D. S., and of crepe volume percentage, Cv led to the adoption of the equation $Cv = 0.9 D. S.$ This equation was confirmed by more than 1,000 parallel determinations from November, 1928, to August, 1930. It is a quick and exact method of finding the crepe volume per cent where an analytical scale can be used.

¹P. Scholz and K. Klotz, *Kautschuk*, Apr., 1931, pp. 66-68.

The volume percentage of crepe figured by this equation from the dry content gives values correct to about 0.2 per cent under normal conditions. Exceptions, where the equation $Cv = 0.9 D. S.$ does not apply, will be considered in detail in a subsequent paper.

Relatively few published data concerning parallel determinations between dry substance content and rubber content agree with the above formula. Thus according to Tromp de Haas, 26 to 54 per cent dry substance content corresponds to 23.5 to 48 per cent crepe, and de Vries cites the figures 33.5 and 30. Our dry substance values on quantities of latex of about 5,000 liters worked up daily, lay between 34.7 and 44 per cent. The corresponding values for crepe volume percentage were between 31.2 and 39.8.

In the future when data of the crepe content are given, the above or equivalent symbols as Cv and Cw should be placed before the figures, since the current value for planters is Cv while the Cw values are necessary for accurate comparison. Crepe

weight percentage equals crepe volume percentage divided by the specific gravity of the latex, indicated as, $Cw = Cv \div S$. Substituting this value in the first equation, $Cw = 0.9 \div S \times D. S.$

By this method the crepe content of latex can be determined in about ten minutes and will be accurate to within 2 per cent.

For large amounts of mixed latex, S can be taken as 0.98 so that the equation would then read $Cw = 0.92 D. S.$ The reliability of even this relation, based as it is on a wide generalization, is proved in practice by the fact that during one month, when latex with Cv varying daily between 41.4 and 23.2 per cent was worked up according to the determinations of two independent laboratories working according to a definite Cw determination process, the crepe equivalent was respectively 15,407 and 15,471 kilos.

In a forthcoming article more will be said regarding the results obtained through development of these new methods, especially as regards the non-rubber constituents of latex.

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Crepe Content in Volume Unit. P. Scholz and K. Klotz, *Kautschuk*, Apr., 1931, pp. 66-68.

SEPARATION OF THE SOLVENT FROM RUBBER AND THE CALCULATION OF THE ENERGY OF SEPARATION. P. Stamberger, *Kautschuk*, Apr., 1931, pp. 68-70.

WORKING WITH THE EXTRUDING MACHINE. *Gummi-Ztg.*, Apr. 17, 1931, p. 1187. Diagrams.

MANUFACTURE OF JAR RINGS. *Gummi-Ztg.*, Apr. 10, 1931, pp. 1145-48. Diagrams.

EFFECT OF SURFACE PRESSURE ON THE PHYSICAL PROPERTIES OF SOFT RUBBER MOLDED GOODS. *Gummi-Ztg.*, Apr. 24, 1931, pp. 1222-24.

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American Rubber Technologists

Homer G. Allen, chem. b. Feb. 6, 1893, Buffalo, N. Y.; Ph.G., U. of Buffalo, 1915; Post graduate work Ind. Chem., 1916-17; chf. chem., 1919-23, Technical Sales Service, 1923-25, U. S. Rubber Reclaiming Co., Buffalo, N. Y.; chf. chem., 1925-

26, Sales, 1926-29, Xylos Rubber Co., Akron, O.; gen. mgr., Xylos Rubber Co., Los Angeles, Calif., since Jan., 1930. Address: 5309 Brynhurst Ave., Los Angeles, Calif.

Herman William Richter, chem. b. June 26, 1891, Dedham, Mass.; Harvard C., A. B., 1913; A. M., 1917. Winthrop C. Durfee (dyestuffs), Boston, Mass., 1916-17; Garhart Dental Specialty Co., Somerville, Mass., 1917-22; president, Randolph Chem. Co., 1922-26; field representative, Eastern Leatherboard Conference, 1928-29; research director, George O. Jenkins Co., Bridgewater, Mass., since 1929. Research: Rubber in the paper industry; reduction of losses in fibreboard manufacture; development of heavy duty industrial flooring. Member: Masons; A. C. S.; Technical Assn., Pulp & Paper Ind.; Phi Beta Kappa; Alpha Chi Sigma; director, Y. M. C. A., Plymouth County, Mass. Address: 203 Park Ave., Bridgewater, Mass.

Biddiblack

BIDDIBLACK is a new and cheap carbonaceous pigment possessing reinforcing, pigmenting, and other properties. It is produced by a refining process from large deposits of a peculiar form of black mineral found near Bideford in Devonshire, England. Unlike gas black, Biddiblack will not fly and accordingly may be incorporated on the ordinary rubber mill. It is also said to impart excellent tear resistance combined with high tensile and as a latex compounding ingredient is particularly useful.

A COMPOUND MIXER WAS DISABLED FOR 36 days because of a fractured left great toe. He was removing a metal compound box from a truck when it fell on his toe. *Rubber Section News Letter*, N. S. C.

Technical Communications

The publishers of INDIA RUBBER WORLD are not responsible for statements and opinions appearing in this department

Heat Resistance of Rubber Stocks

THE present widespread interest in heat resistant stocks for inner tube work brings to mind other large uses in which stocks must stand high temperatures over considerable periods of time.

A very good heat resistant stock, suitable for use where high resistance to heat is required, can be prepared by the use of whiting, lithopone, asbestos, clay, or other inert fillers beside the blacks. As a specific example the following formula will suffice to show what can be done with an asbestos stock for heat resistance:

Smoked sheet	100.000
Zinc oxide	5.000
Stearic acid	1.500
Neozone "A"	1.500
F.M.T.T.*	1.625
Asbestine	60.000

*F.M.T.T. is tetramethyl thiuram tetrasulphide.

Cured 10 minutes at 50 pounds this stock produced a stretch of 680 per cent, a load at 600 per cent elongation of 1,600 lbs., and a tensile of 2,180 lbs. per sq. in. After heating this stock in an air pressure of 35 lbs. per sq. in. for 16 hours and at 258° F. it had a stretch of 610 per cent, load at 600 per cent elongation of 1,600 lbs., and tensile of 1,620 lbs. per sq. in. Stocks containing other accelerators with free sulphur perished under these conditions. It will be noted that the modulus remained unchanged during the heat treatment.

Our laboratory experiments indicate that heat resistance of rubber stocks is not so dependent upon the filler used as upon proper vulcanization of the stock in the absence of free sulphur. Data from The Koessler & Hasslacher Chemical Co., 10 E. 40th St., New York, N. Y.

Neozone Classification

IN THE classification of antioxidants as to toxicity quoted in this journal¹, as summarized by the National Safety Council, Neozone was reported in sub-group 3.

In point of fact and in order to make it clear the following correction should be noted: namely, that Neozone A and Neozone D are classified by the National Safety Council as being entirely safe and that it is only Neozone B, Neozone C, and standard Neozone that are placed in sub-group 3.

The following paragraphs taken from the published text² will make this matter clear.

Neozone

"133. There are several antioxidants which come under the name of Neozone

being designated as straight Neozone, Neozone A, B, C, and D. The straight Neozone, Neozone B, and C consist of phenyl-alpha-naphthylamine and meta tolylene diamine in varying proportions.

"134. Manufacturers have carried out quite extensive tests on the toxicity of these materials. The phenyl-alpha-naphthylamine is relatively non-toxic, but the meta-tolylene diamine is sufficiently toxic to make it advisable to use proper precautions in the handling so that this material will not be carried into the digestive tract through dust or promiscuous handling. The Neozone being mixed with wax prevents any trouble from dust, but some care should be exercised in how the material is handled."

The succeeding paragraph on the toxicity of Neozones is supplied by the manufacturers.³

"Neozone A is pure phenyl-alpha-naphthylamine. Neozone D is pure phenyl-beta-naphthylamine. These materials are relatively non-toxic, and no trouble has been experienced in the handling of them. The National Safety Council gives these two antioxidants a clean bill of health and classifies standard Neozone, Neozone B, and Neozone C in Group 3, which includes materials that are safe to use when reasonable care is exercised in their handling."

³ E. I. du Pont de Nemours & Co., Wilmington, Del.

The Cylinder of a Tubing Machine

THE body of a tubing machine is the cylinder within which the rubber or other compound is kneaded and compressed by means of the revolving stock screw. Outwardly the features of the cylinder are: steam and water inlet valves at top, drip openings beneath, head flange stud bolts in front, thrust bearing flange at the rear, pedestal flange at the bottom, and tangent feed opening.

The essential internal features of the cylinder are: stepped water jacket circulation for steam or water, renewable water tight bushing, and self feeding intake throat. All operating wear in the cylinder is confined to the bushing which lines the bore and seals the water passages. Bronze linings are offered for compounds subject to discoloration by iron.

The cooling or heating medium is introduced at the top of the cylinder and travels by positive annular circulation until it reaches the bottom outlet. It is unnecessary to reverse the direction of flow to insure proper cooling, and no attention is required to clean or flush out sediment. Data from John Royle & Sons, Paterson, N. J.

Action of Solvents on Vulcanized Rubber

THE important points to be considered in reducing the swelling capacity of vulcanized rubber are the choice of a filler which combines high resistance to oil absorption, high loading capacity, and good reinforcing value with reasonable cost. P-33 and Thermax black both satisfy these requirements admirably; the latter produces for the same loading distinctly softer stocks than the former.

The use of a good grade of reclaimed rubber, preferably a whole tire reclaim, has some advantages, but larger reductions in swelling capacity may be obtained by high loadings of P-33 or Thermax than by dilution of the rubber with reclaim. Use of much reclaimed rubber together with these fillers results in very hard stocks with high resistance to swelling but low physical quality.

Enough sulphur to produce a good tight cure without danger of softening from reversion is advised. This result may be insured and enhanced by using a small proportion of Vandex, say 0.5 to 1 per cent on the rubber in addition to the sulphur which should not be under 3 per cent. By this means, also, better aging stocks may be obtained than by simply increasing the sulphur.

The use of antioxidants is strongly recommended for better grades of goods to prevent as far as possible the slow but steady increase in swelling caused by gradual oxidation and softening of the rubber when in contact with solvents. AgeRite Resin or Powder is very suitable.

Low or high temperatures may be used in curing stocks, with equally good results, provided that the proper time of cure for the temperature level used, be chosen. Sufficient accelerator should be applied to accomplish the desired cure in a reasonably short time. Captax or Altax or mixtures of the two are well adapted for this purpose. *The Vanderbilt News*, Feb.-Mar., 1931.

Glycera Wax

GLYCERA, a new synthetic product, is light tan in color, melts at about 140° F., is odorless, edible, and more tasteless than any natural wax. It blends readily with other waxes and resins and acts as a softener in rubber. It is good as an emulsifying agent for oils, waxes, fats, hydrocarbons, etc. Such emulsions are useful in waterproofing compounds, shoe creams, water colors, water inks, glazing of felt, fur, paper, textiles, and in many other specialty products. Data from Glyco Products Co., Inc., Bush Terminal Bldg. No. 5, Brooklyn, New York.

¹ INDIA RUBBER WORLD, May 1, 1931, p. 69.

² Part I—Accelerators, Antioxidants, and Dry Organic Compounds, Industrial Safety Series No. Ru-1. Published by National Safety Council, 20 N. Wacker Dr., Chicago, Ill.

New Machines and Appliances

High Pressure Flexo Joints

IN INDUSTRIAL development the use of superheated steam at comparatively low pressures has progressed to the point where pressures up to 1,000 pounds with corresponding temperatures are not uncommon. To fill this definite industrial need a steel flexible joint has been produced in the well known Flexo construction.

For ordinary rubber plant equipment standard joints of this type made in bronze are very extensively used. They are designed for working steam pressures up to 250 pounds and temperatures not exceeding 500° F. Their outstanding feature is simplicity as there are no springs, ground surfaces, or little parts. They allow a full pipe area in any position.

These cast steel joints, manufactured to conform to the American Engineering Standards Committee specifications for cast steel fittings, are designed for use where



Cast Steel Flexo Joint

ever pressures or temperatures are high, up to 1,350 pounds' working steam pressure, or to withstand corrosion and erosion which are common in processes of various industries. Flexo Supply Co., Inc., St. Louis, Mo.

Motorized Speed Drive

AN UNIQUE variable speed drive, which combines motor, speed changer, speed reducer, and control in a single housing, is pictured in the illustration. It is compact, easily mounted, quiet, and efficient because of the elimination of bearings, couplings, and at least two sets of gear reductions. It is made in sizes to deliver from 1/4 h.p. to 7.5 h.p. and is suitable for driving feeders, assembly conveyers, mixers, machine tools, pumps and practically every application where a variable speed drive is needed.

The unit is a complete drive in itself and ready to couple to the machine to be driven. The motor section is usually wound to operate at 1,200 r.p.m., and the drive will deliver the power at any speed between 24

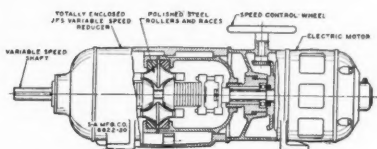


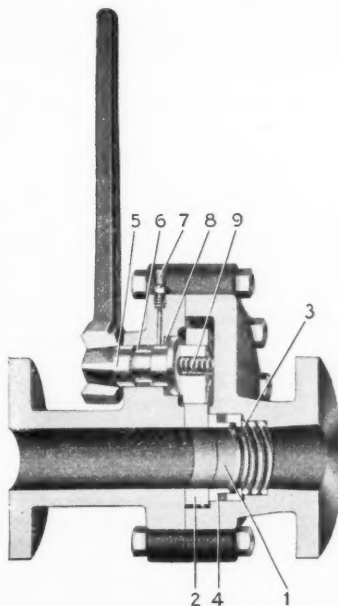
Diagram of Motorized Speed Drive

to 144 r.p.m. or 120 to 720 r.p.m. The output speed is increased or decreased while the machine is in motion by turning the small hand wheel on top of the housing.

The new drive has several features, which are as follows: The motor is an integral part of drive; the machine is compact, as over 20 per cent of length is saved by eliminating coupling and several bearings; installation is simple; the entire drive can be mounted in any position with but four bolts; no alinement and no special supports are necessary; it operates without vibration and almost without sound; no moving parts are exposed to endanger operators; enduring service is assured as the variable speed reducer mechanism operates in oil, entirely protected from dust and atmospheric conditions; all motor and transmission bearings are ball bearing. Stephens-Adamson Mfg. Co., Aurora, Ill.

Pretite Valves

ONE of a new line of valves recently developed for general use in rubber factories is here pictured. The unique feature of these straight-through-flow valves is a new two-piece sealing bushing (1) on the inlet side so that, as its name



Yarnall-Waring Pretite Valve

implies, it is pre-tight. This bushing is positively adjusted against the disk (2) by a heavy corrosion resisting spring (3). The sealing bushing is provided with a packing (4). The spring pressure is applied only on the annular area on the end of the sealing bushing which is not against the disk. This bushing is continually ground in, just as the opposite face of the one piece solid disk (2) is ground in as it passes across the seat. This solid disk or gate is in positive contact with its two seats during the entire opening and closing cycle.

The valve stem (5) is packed at two points (6) and (8). These packings are compressed by a spring (9). The valve is lubricated by an Alemite fitting (7) with the grease properly guided to the sliding surfaces. These valves are made in various materials and in sizes from 1/2-inch to 4 inches inclusive. Yarnall-Waring Co., Chestnut Hill, Philadelphia, Pa.



Squires Steam Trap

A Blast Trap

AMONG the inevitable pieces of equipment in a rubber manufacturing plant are steam traps. Many efficient forms of these are found in rubber factories, including the one here pictured. This device is the outcome of years of experience in steam trap manufacture and is distinguished by the ready access to the few working parts, low cost of maintenance, great capacity, durability, and high efficiency.

It is a blast trap, the merits of which have long been demonstrated in rubber and many other industrial plants, and on both high and low pressure heating systems. All joints are above the water line and are exposed to the temperature of the steam only; therefore, the corrosion or unequal expansion and contraction incident to the varied temperatures of a partially submerged joint is not encountered.

Every joint is machined, and all parts are made interchangeable. It is furnished with standard valve or double valve mechanism as requested. The C. E. Squires Co., Cleveland, O.



Giant Clutch Facing

Largest Clutch Facing

THE illustration represents one of a group of four molded asbestos clutch facings believed to be the largest of the kind in the world. The facing is molded in 12 separate sections which complete a circle 12 feet 10 inches outside diameter, 12 inch flange and 1 inch thick. The clutch, as viewed in the picture, was photographed from above as it lay on a concrete surface with two workmen lying on their backs along its internal diameter to make the picture more realistic.

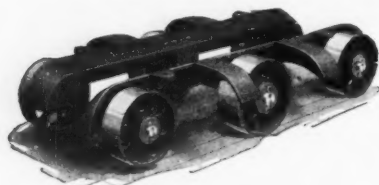
Four of these disks were specially designed and made for use on a mine hoist clutch by a large southern mining company in the United States. These disks function the same as an automobile clutch facing. They were made by Manhattan Rubber Mfg. Division, Raybestos-Manhattan, Inc., Passaic, N. J.

Marion Dollies

IN RUBBER factories, as in nearly all industrial plants, dolly trucks are a very useful means of transferring heavy loads on wheels to inaccessible parts of the plant, where overhead conveyers are not practical.

An all-steel handy truck of this sort is here pictured. It is adapted for moving loads of different shapes and sizes, having a capacity of 4,000 pounds. It is especially good for handling boxes, rolls, barrels, and odd shapes.

These all metal trucks are built in standard low wheel and high wheel patterns, standing respectively 3 and 4 inches off the



Marion Dolly Truck

floor. All have 6 roller bearing wheels; the center pair are larger than the others, thus permitting easy turning under load. Drums and barrels can be loaded from the side or pushed on when standing on end. The latter is a good way to handle them on slippery floors. The Marion Malleable Iron Works, Marion, Ind.

Utility Floodlight

A GENERAL utility floodlight projector is often very useful in the event of factory night work. The projector shown in the picture weighs less than 3 pounds and measures less than 9 inches wide, 10 inches deep, and 13 inches high with its supporting stand, and is built for a 100-watt inside frosted general service incandescent lamp with $4\frac{3}{8}$ inch light center and medium screw base.



Novalux Handy Floodlight

The new unit is composed of a sheet aluminum combination casing and reflector, pressed together with a separately drawn socket supporting cap over a supporting ring. Socket support, casing reflector, and ring are made substantially integral by the pressing and beading operation. The casing is polished inside, forming the specular surface for reflecting purposes.

The front lens, 8 inches in diameter and of heat-resisting, clear, convex glass, is clamped against a gasket fitting in a groove in the reflector; a rolled split clamping ring with non-losable clamp screw at the bottom engages two clamp castings riveted to the ring. A rubber-covered twin-conductor lamp cord is woven through a rubber bushing affixed to the socket supporting cap to prevent entrance of moisture and abrasion of the cord.

The support for the projector is of cadmium plated steel. Vertical and horizontal adjustments are obtained with wing nuts in the swivel support and base. The projector is finished in dark green baking enamel for base, swivel support, and casing. The clamping ring is aluminum lacquer sprayed, and the clamping bolts and wing nuts are cadmium plated. General Electric Co., Schenectady, N. Y.

Tire Remover

THE high speed tire changer pictured makes it easy to take a tire off or put a tire on a drop center rim. The changer consists of two spring steel clips joined together by a 9-inch heavy chain, heavy cadmium plated to prevent rusting. Changing tires on drop center rims is difficult only because one tire bead will not slide into the bottom of the rim well and allow



Firestone Tire Changer

the other bead to be slipped off over the rim.

The tire changer illustrated snaps over the rim flange and acts as a slide, covering the bead seat of the rim. This construction then allows the bead to slide easily into the well opposite the point where the bead is being pried over the rim flange with tire tools.

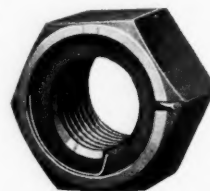
This tire changer can be used on any car now equipped with drop center rims. Firestone Tire & Rubber Co., Akron, O.

Armortop for Floors

THE soft granular surface of concrete floors is subject to rapid wear by constant walking, trucking, and sweeping, which processes cause roughness and rutting that ultimately require relaying of the floor. This necessity can be eliminated by brushing the surface with a preparation that immediately combines chemically with cement to form a new compound which binds the loose disintegrating particles of the concrete into a dense hard mass. The hardening effect is reached so promptly that the floor job can be done after closing hours, and by the following morning the floor is ready for use without loss of time. Anti-Hydro Waterproofing Co., 265-295 Badger Ave., Newark, N. J.

Self-Locking Nut

FEW mechanical devices are actually foolproof, but this one seems to be so, besides being very simple in construction. It can replace all ordinary nuts in the many places where vibration shakes them loose; hence is valuable on machines of all sorts whether as products or factory equipment. Its use guarantees safety and economy. It is installed and removed in the same manner as a plain hexagon nut.

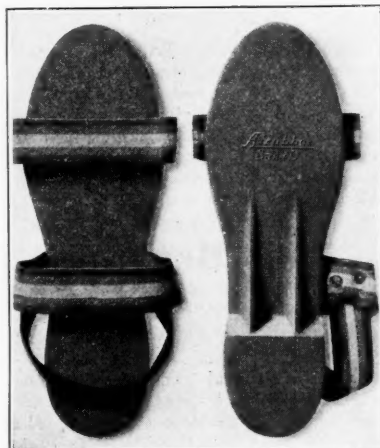


Perma-tite Nut

After its removal one simply straightens the locking wire to its original position, and the nut may be used repeatedly. This self-locking nut is made in sizes to fulfill every requirement. Industrial Lock Nut Co., South Hanover, Mass.

New Goods and Specialties

FOR THE BEACH



Beach Clog

Airubber SandL

THE current propaganda against "athlete's foot" has led to an increased use of footwear in bathing circles. Another attractive clog for this purpose comes from the New York Rubber Corp., Beacon, N. Y. The shoe, here illustrated, is named the Airubber SandL.

It boasts a sole of brick-red elastic live rubber with smooth surfaces. The sole is $\frac{5}{8}$ -inch thick under the ball of the foot; while the heel is $\frac{3}{4}$ -inch high and of the spring type. Desirable rigidity is secured by molding to stiffening ridges lengthwise on the instep from heel forward, and molding a stiffener inside the sole of the toe. The grade of the rubber used in the sole is said to be soft to the foot, and this softness is not cut easily by stones and gravel.

Toe and heel straps are of fabric in gray, green, and red. The toe and the instep straps are non-elastic, but the heel strap is elastic. No buttons or snap buttons appear on the clog, which is made in sizes from 4 to 10 for children and adults.

The manufacturer claims the SandL enables running and jumping on rough surfaces while affording thorough protection to the foot. Besides, this clog, designed for use at beaches, swimming pools, and public showers, is clean, sanitary, and attractive.

"Waterwear" Bathing Suit

THE newest of the new bathing suits incorporates three exclusive features of interest to rubber manufacturers as well as to those who will wear the suits this summer. An elastic bodice top in the women's models permits the straps to be worn off the shoulders. The skirt hem is elastic, and so are the leg-bands.

The manufacturer claims that the rubber

which enters into these features cannot be injured by salt water or sunshine. Patents have been issued on the elastic skirt and are pending on the bodice top. Women's suits are available with or without the bodice top, but the elastic hems and leg-bands are a feature of all models for men, women, and children. Munsingwear Corp., Chicago, Ill.

Sleepy-Time Dolls and Beach Pillows

A CLEVER idea for novelties originated with a Southern woman. She has designed a waterproof doll to delight the heart of any sleepy youngster, and a beach pillow which sand and sun and tide will

the dolls are painted in oils, and styles of arranging children's hair in past decades have been reproduced in yarn and worsted, even to the "kinks" for Topsy.

The dolls are gowned in a single cotton print garment resembling the baby's sleeping blanket gathered at the bottom; thus feet are unnecessary. The hands are somewhat mitteny. But no art is lacking in face and head.

If the doll, hair, dress, and all, happens to go exploring in the bathtub, she will come through the ordeal as good as new. She is the cuddly kind and does not stand, but she goes to bed beautifully, even if she is given to lying quietly awake all night, staring at the ceiling!

The beach pillows, made in a similar way, represent oranges or tomatoes or turtles, as the case may be. The object is to provide comfort and a touch of color among the beach accessories. Mrs. Mary H. N. MacDonald, 70 Irving Pl., New York, N. Y.



Charles Curtis

Rubberized Dolls and Pillows

not harm. All patent rights are reserved on these articles, some of which are here illustrated.

They are made of fabric rubberized on the outside, in both plain colors and figured, and are stuffed with kapok. The faces of

Rubber Swimming Ring

AN IMPROVED swimming belt is offered for those who are eager to swim but do not trust themselves without some support in the water. The Swim-Rite belt, here illustrated, is designed to fit directly under the armpits around the chest. An outstanding feature of this type of rubber ring is the flat ventilated surface that goes under the arms.

The belt is either stepped into and pulled into proper position or slipped over the head and settled under the armpits. Always, though, the valve is topmost on the chest. After the belt is in proper position, the user turns the valve and inflates the belt as tightly as possible. The valve next is turned back into locking position so that it is absolutely tight. The bather then is all ready for a swim.

Swim-Rite belt comes in orange, green, or blue. It is made in five sizes, for men, women, and children; junior, small, medium, large, and extra-large. Swim-Rite, 322 W. Baltimore St., Baltimore, Md.



Stepping into a Swim-Rite Belt

Editor's Book Table

NEW PUBLICATIONS

"R & H Quarterly Price List." The Roessler & Hasslacher Chemical Co., 10 E. 40th St., New York, N. Y. This list, dated April, 1931, is the first issue of the company's prices of chemicals as successor to the monthly list formerly issued. At intervals it will contain descriptive technical matter referring to the work done by the R & H service departments and laboratories with respect to the development of the uses of the chemical specialties of the company.

"Engineering Data Book of Condor V-Belt." The Manhattan Rubber Mfg. Division of Raybestos-Manhattan, Inc., Passaic, N. J. This data book presents in convenient and concise form a compendium of information for those interested in quality belts for V-belt drives, and supplies facts calculated to simplify ordering correct sizes. It also provides valuable practical operating and designing information for the engineer.

"Protective Rubber Lining and Covering for Industry." The Manhattan Rubber Mfg. Division of Raybestos-Manhattan, Inc., Passaic, N. J. This illustrated brochure covers in a comprehensive way the application of rubber to metals for protection of steel tanks, pipe and fittings, racks and fans, stirrers, extractors, containers, etc. This booklet presents much valuable information on the extent and the variety of the applications of rubber as protection against corrosion in the processes of chemical industries.

"Bibliographic Bulletin No. 2." Fourth annual supplement. By Lois H. Pugsley, Mellon Institute of Industrial Research, Pittsburgh, Pa. A list of the books, bulletins, journal contributions, and patents by members of Mellon Institute of Industrial Research during the calendar year 1930.

"Hard Rubber Products and Tank and Tank Car Linings." United States Rubber Co., 1790 Broadway, New York, N. Y. A complete line of hard rubber pipe and fittings are illustrated and described in detail with dimensioned sketches. A complete list of mechanical rubber goods also is given for the process industries, including the new U. S. process rubber lining for tanks, tank cars, and containers.

"Rubber Goods for the Chemical Industry." The B. F. Goodrich Co., Akron, O. This publication comprises several illustrated bulletins descriptive of the vulcalock process for lining steel tanks with soft rubber. Hard rubber pipe, fittings, and utensils, acid seal paints, transmission and conveyer belting, hose and packing are also pictured and described.

"Tires." Federated Business Publications, Inc., 420 Lexington Ave., New York, N. Y. This well-known magazine, long recognized as the authoritative trade paper of the automobile tire industry, will appear in a new handy size beginning with the current June issue. The new magazine will be larger and more readable than a pocket size booklet, and will have a controlled coverage of 20,000 circulation monthly. This is in conformity with the publisher's new plan and policy that extends the value of the advertiser's dollar as it has been noticeably extended in other markets.

"The Industrial Hose Handbook." Electric Hose & Rubber Co., Wilmington, Del. This reference book for purchasing agents, engineers, superintendents, master mechanics, foremen, and users and sellers of hose, presents the result of an intensive study of industrial hose service requirements. The information it contains is indexed and presented in five chapters, entitled respectively, Kinds of Hose Used, The Industries Using Hose, Manufacturers of Apparatus or Equipment Which Includes Hose, Other Users of Hose, Brands of Electric Hose.

"Asbestos and Magnesite Products." Keasbey & Mattison Co., Ambler, Pa. This illustrated catalog comprises descriptions, data, and information on the applications of the Ambler asbestos products to industrial uses. The products referred to comprise paper, millboard, packings, gaskets, textiles, and garments.

"Servus 1931 Rubber Footwear." Servus Rubber Co., Rock Island, Ill. This footwear merchandising book is the result of a nationwide survey which disclosed that the average retail dealer contacts only 43 per cent of his potential footwear market. The book catalogs many interesting numbers in colors and as worn in a large variety of service. Accompanying the book is the announcement of the Servus merchandising plan for dealers.

"1931 Year Book." The Tire and Rim Association, Inc., Cleveland, O. This complete data book, thumb indexed, is a guide to standard rim contours, loads and inflations, valves, passenger car tires, truck and bus tires, airplane tires, motorcycle tires, and solid tires. In addition the appendix contains information on European rim contours, loads, inflations, etc.; also the Constitution and By-Laws of the Tire and Rim Association. The book is priced at \$2.

"Tire Table of Balloon Tires." National Rubber Machinery Co., Akron, O.; Clifton, N. J.; and Columbiana, O. This pocket folder gives the sizes of balloon tires on domestic and foreign cars, and the makers of the cars that have used them for the five years from 1927 to 1931 inclusive.

Book Reviews

"Annual Survey of American Chemistry." Volume V, 1930. Edited by Clarence J. West, Foreword by Harry A. Curtis, Chairman, Division of Chemistry and Chemical Technology. Published for National Research Council by The Chemical Catalog Co., Inc., 419 Fourth Avenue, New York, N. Y., 1931. Cloth, 629 pages 5 by 8 1/4 inches. Author and subject indices. Price \$5 net.

In this annual publication the results of research in 40 branches of chemical technology are systematically outlined by 46 outstanding specialists. The enlargement of the amount of research recorded in successive issues of this annual is said in the foreword to indicate probably both an increase in the volume of research in America and more diligence on the part of the contributors in covering their topics.

A full review of rubber research is given by John T. Blake, research chemist, Simplex Wire & Cable Co., Boston, Mass. The topics in the review of rubber are as follows: Cultivation, structure, physics, synthetic rubber, vulcanization, accelerators, aging and antioxidants, compounding ingredients, electrical insulation, physical testing, chemical analysis, reclaimed rubber, etc.

HUNGARY

Except in the case of tires, Germany and Austria appear to be the chief sources of supply for rubber goods to Hungary. In 1930 that country imported a total of 170 quintals of uncovered rubber thread, 497 quintals of unvulcanized cut sheet, rubber dough, etc.; 308 quintals of asbestos and rubber goods; 189 quintals of rubber and balata belting; 857 quintals of other mechanical rubber goods; 2,420 quintals of footwear; 520 quintals of solid tires vulcanized to iron rims; 83 quintals of hollow soft rubber goods; 447 quintals of other soft rubber goods; 112 kilos of seamless dipped goods; 231 quintals of fabric combined with rubber; and 96 quintals of hard rubber goods. The imports of pneumatic tires in all came to 6,678 quintals of which France supplied 1,898 quintals; United States, 1,614 quintals; Germany, 1,452 quintals; and Austria, 1,084 quintals.

Rubber Industry in America

OHIO

Goodyear Activities

Inauguration of a five-and-a-half day week in the factory and an increase of production at the main plant from 56,500 tires a day to 59,000 was announced by P. W. Litchfield, president of The Goodyear Tire & Rubber Co., Akron. Some 800 men will be put to work to secure the additional output. He stated that only former employees now in Akron were being reemployed and that men to be rehired would be sent for as they were needed. Tube production was stepped up at the same time from 60,000 to 64,000 per day. This new increase in tire production is the fourth made at Goodyear this year, starting from 33,000 in December. Low inventories coupled with improved sales both to car manufacturers and car owners generally was given as the reason for the present stepping up of Goodyear production.

The Akron Association of Purchasing Agents was host to 100 members of the Cleveland association at a dinner meeting in the Goodyear general office dining room. Assistant Sales Manager G. A. Waddle welcomed the Cleveland purchasing agents, and Ward T. Van Orman, Goodyear's famous balloonist, reviewed the developments of lighter-than-air craft and told some of his experiences.

Purchasing agents from Akron and other eastern Ohio cities met as guests of the Canton Association of Purchasing Agents. Harry E. Blythe, assistant to P. W. Litchfield, spoke on airship development. Joseph E. Mills, national president of the Purchasing Agents' Association, was one of the prominent guests.

Clarence E. Miller, for seven years secretary of the Employees Activities Committee, has been appointed manager of the Goodyear Compensation Division. He has been connected with the company for 17 years. He succeeds Everett Olson, who was promoted to Inter-Plant Relations.

W. C. State, Goodyear consulting engineer, in recognition of his three decades of service with the company, was recently presented with a plaque and a motion picture outfit.

P. W. Litchfield was reelected to the board of directors of the United States Chamber of Commerce at a recent meeting held in Atlantic City. Among the others who attended were: V. R. Stevens, secretary of the local chamber of commerce, Attorney Robert Guinther, Harry E. Blythe, and George R. Lamson, statistician of the Firestone Tire & Rubber Co.

W. O'Neil, president of the General Tire & Rubber Co., Akron, when asked what is the best way to prevent future industrial depressions, replied, "Leveling-off production."

This, in his opinion is one of the most important means of guarding against them.

"In times when business is plentiful, manufacturers would do well to guard against adopting new schemes of promotion and selling which temporarily add to the estimate of demand.

"Advertising and selling should be particularly stressed in the direct ratio as sales resistance increases. Out-of-season selling should be stressed more than ever. This will prevent peak capacity, which is really over-capacity, and which causes much trouble.

"It takes labor and material to build a plant; it takes people to make the merchandise and it takes people to handle the merchandise. When an unusually large number of people are employed to handle over capacity, many of them are thrown out of work when conditions return to a normal level."

Cyrus Eaton, Cleveland financier, who led the foes of the proposed billion-dollar Bethlehem Steel-Youngstown Sheet and Tube merger, some of his financial assistants and some of the finance companies in which he is associated, were attacked in three suits filed recently. Reports are confirmed that William G. Mather, friend and associate of Mr. Eaton, is the leading figure in the group acquiring 300,000 shares of Continental Shares, Inc., common stock from Otis & Co. at a price of \$1,500,000. E. A. Pierce & Co., New York, N. Y., has acquired the brokerage business of Otis & Co. in Akron and six other cities.

Toledo Rubber Products Co., Toledo, manufacturer of rubber rugs, mats, and other rubber products, is arranging to lease the remainder of the floor space in the building in which it now occupies half the available space. At its recent annual meeting a dividend of \$6.50 a share was voted to stockholders. The officers of the company are: S. M. Williams, president; E. W. Coble, vice president; H. J. Johnson, of the Johnson Rubber Co., Middlefield, O., vice president; E. N. Belnap, treasurer; and W. F. Miller, secretary.

The Master Tire & Rubber Co., controlling The Falls Rubber Co., Cuyahoga Falls, and The Giant Tire & Rubber Co. and the Cooper Corp., both of Findlay, all in O., according to current reports is completing negotiations to acquire an eastern plant.

Goodrich Notes

At the annual meeting of the stockholders of The B. F. Goodrich Co., New York, N. Y., May 6, the six directors whose term of office expired at this time were reelected: namely, C. C. Goodrich, F. H. Mason, Wesson Seyburn, Albert A. Sprague, T. B. Tomkinson, and V. I. Montenyohl. The stockholders voted to retire 11,880 shares of preferred stock heretofore acquired for this purpose in accordance with the Charter provision. At the directors' meeting immediately after the stockholders', the following officers were reelected: J. D. Tew, who for three years has been head of the Goodrich company, remains its president; D. M. Goodrich, chairman of the board; C. B. Raymond, vice chairman of the board and vice president of the company; T. G. Graham, first vice president; J. H. Connors, A. B. Newhall, W. A. Means, vice presidents; S. M. Jett, secretary; V. I. Montenyohl, treasurer, and T. B. Tomkinson, comptroller.

Twenty-two drivers and mechanics of The B. F. Goodrich Co.'s Silver Fleet of test cars recently were awarded a bronze plaque for having operated throughout 1930 without an accident. The fleet worked six days a week, 24 hours a day, averaging nearly 600 miles a day for nearly 2,000,000 miles for the year. It is upon the records of this fleet and the fleets of years before that the Silvertown Safety League driving code, sponsored by Goodrich, is based.

About a score of representatives from other cities in Ohio, Indiana, Illinois, and New York recently attended the shop methods conference of the American Management Association which was held in the Goodrich sales conference hall. They then made an inspection trip through the factory. P. L. Dildine, manager of the Goodrich factory standards department, is vice president of the association and in charge of shop methods.

P. J. Kelly, Goodrich advertising manager, had his tonsils taken out at City Hospital and the doctors state that he is coming along in excellent fashion. He went to the hospital after delivering a talk advocating greater care against industrial accidents, before a crowd at an industrial safety rally.

Sir Walrond Sinclair, managing director of British Goodrich Rubber Co., Ltd., and his son Alan, visited America.

C. A. Shriver Co., manufacturer of industrial and surgical goods, announce the removal of its offices and factory from 1802 to 1657-59 Dorr St., Toledo.

The Firestone Tire & Rubber Co.'s new South American factory near Buenos Aires turned out its first tire on April 30, according to a cable received from John L. Cohill, vice president and general manager of the plant. Upon receipt of the news Harvey Firestone, Jr., cabled congratulations to H. H. McGregor, chief engineer at the Argentine plant, who had charge of its construction and equipment.

"The world's most beautiful motor car," known as "Station FSOV, Firestone Studio on Wheels," completely equipped for broadcast receiving and reproducing, visited Akron on May 22, extending an invitation to visit the 1933 World's Fair in Chicago. It was driven to the Firestone factory where a program was presented from the sound proof studio. H. O. McGee, its designer and builder, also the originator and builder of the trackless trains now touring the world on Firestone tires, accompanied the car to the factory. It will tour the United States, presenting daily programs, making its headquarters at Firestone One-Stop service stations on its route. The car was built at a cost exceeding \$25,000.

Electrical Maintenance Engineers will hold its national convention at the Mayflower Hotel on June 4 and 5. About 500 electrical engineers from every section of the country are expected to attend. P. W. Litchfield, president of The Goodyear Tire & Rubber Co., will speak at the luncheon on June 4 on "The Dirigible Akron." The visitors will then be taken through the Goodyear-Zeppelin Corp. hangar.

Seiberling Rubber Co., Akron, has increased working turns in all its plants to six days a week with three shifts on eight hours daily. Previously the company worked four and one half days a week. The company announced that the personnel had been increased 20 per cent.

India Tire & Rubber Co., Akron, is operating at capacity six days a week. Additional machinery is being installed and will be ready to operate in about ten days. With this production increase, the sixth since January, India will be producing 14,400 tires a week as against 12,300 now. The previous record in 1925 was 10,500 a week. The company also reports substantial increases in truck and bus tire sales.

John A. MacMillan, president of the Dayton Rubber Co., Dayton, stated that the plant is operating on an eight-hour, six-day schedule or at about capacity, against 60 per cent last month. Dealers' sales during April showed substantial improvement, with truck and bus tires reflecting the largest gain.

The Smith Chemical & Color Co., 28 Moore St., New York, N. Y., has appointed Breves-Schriner Co., 2501 W. Third St., Cleveland, as its selling agents in the Ohio territory. To expedite the filling of orders and shipments, arrangements are under way to carry an adequate stock of dry colors and mineral fillers.

NEW JERSEY

Some branches of the rubber industry have shown a substantial increase during the past month; while others have not picked up any. Tire and tube production has increased a little over previous months. Rubber tiling factories and some producing hard rubber goods are operating overtime. Heel and sole output, however, remains fair, and the same applies to belting, hose, and packing.

Murray Rubber Co., Trenton, announces that business has improved to such an extent that 100 additional tire and tube makers have been employed. More are expected to be added shortly. Production has been doubled since the first of the year, and sales have increased so rapidly that the concern has now gone into foreign trade. Export branches function in China, Burma, and South America. In the United States the sales organization numbers 1,500 stores. Raymond H. Paddock, of Trenton, former general sales manager of the Murray company, has been placed in charge of West Coast sales and has opened a number of stores in California, with headquarters in Los Angeles. James H. Hower, of Trenton, veteran Murray Co. salesman, has been sent to Texas to open an outlet there. Foreign sales are being directed by Albert Cesea, of New York. The company has prospered recently under the receiver, Alfred H. Branham, vice president and general manager.

American Hard Rubber Co., Boonton Ave., Butler, will erect a brick and steel addition to cost \$40,000.

Airplane Hub Tire

A PNEUMATIC tire built on a hub for landing gear of airplanes, and here shown in cross-section, is constructed as follows, according to recent patents.¹



Hub Tire

threaded through slits in the loops.

The band is shaped upon the hub by inflation. The temporary beads are removed by disengaging the overlapping edge portions of the plies. Permanent beads having anchoring strips are inserted to replace the temporary beads. The plies are then covered with tread and sidewall rubber ready for vulcanizing.

¹U. S. Patents Nos. 1,779,244 and 1,779,392, Oct. 21, 1930.

An endless band is provided composed of rubberized cord plies or fabric tire building material. A number of plies are lapped back upon the band, thus forming loops at the opposite edges of the band. The edges defining these loops are gathered inwardly about temporary beads, which are

Essex Rubber Co., Trenton, now runs full time with a working force of 350. The company expects an upward trend in business for months to come. The increase is especially noticeable in rubber specialties for summer use. Other departments are also busy.

Puritan Rubber Co., Trenton, has been compelled to install a night shift in some departments to take care of increasing orders for rubber tiling.

Joseph Stokes Rubber Co., Trenton, is experiencing a boom in business; so two departments work twenty-four hours daily. The other departments are operating normally. The company now uses a new three-story addition, 85 by 103 feet, as a mold and press room. Modern machinery has been installed in the structure.

Luzerne Rubber Co., Trenton, finds that the hard rubber business has not improved during the past few weeks.

Thermoid Company, Trenton, reports that April business showed a substantial increase over March and that May would show still better results. Ray Sailey, former head of the hose department of the Murray Rubber Co., Trenton, has joined the Thermoid Company.

Howard M. West, of the Mercer Rubber Co., Hamilton Square, on an extended trip through the Midwest, declares that business is improving. The company found conditions good during April.

Pocono Rubber Cloth Co., Trenton, announces that business is gaining slowly with the outlook brighter.

Whitehead Bros. Rubber Co., Trenton, operating five days a week, expects to continue on that schedule.

C. Edward Murray, Jr., former president of the Murray Rubber Co., Trenton, is now with the Crescent Insulated Wire & Cable Co., Trenton, of which his father, General C. Edward Murray, is president.

The New York Belting & Packing Co., manufacturers of mechanical rubber goods, has moved its headquarters from 91 Chambers St., New York, N. Y., to its factory at Passaic, N. J., in the interest of more efficient operation. The company is also closing its several branches and will hereafter confine its activities to the solicitation of jobber business.

The United States Board of Tax Appeal, Washington, D. C., has upheld the commissioner of internal revenue in his demand for an estate tax deficiency in the amount of \$204,853.54, levied against the estate of the late George R. Cook, of Trenton, N. J. Appeal had been taken from the finding of the revenue department chief by Horace T. Cook, Henry N. Young, and the Trenton Trust Co., executors of the Cook estate. Mr. Cook left an estate of nearly \$2,000,000. At the time of his death he was president of the Acme Rubber Co., Hamilton Rubber Co., and the Combination Rubber Co., which position is now held by his son, Horace T. Cook.

EASTERN AND SOUTHERN

Chemical Exposition

The Thirteenth National Exposition of Chemical Industries was held at the Grand Central Palace, New York, N. Y., May 4 to 9, 1931. The first twelve of this series of expositions were held annually. The thirteenth inaugurates the change to a biennial interval for future expositions of progress in the chemical industries.

In the last few years notable achievement has been made in the development of means for the protection of industrial apparatus against corrosion and abrasion. In this connection rubber, both hard and soft, has a very important part, illustrated by the great variety exhibited of rubber goods specially designed for the chemical industry.

Applications in interminable variety were shown in plastics of all types and colors led by Bakelite and including many other forms of synthetic resin products. Rubber applications in chemical industry were featured in the exhibits of the following rubber goods companies:

The American Hard Rubber Co.; The B. F. Goodrich Co.; Lucerne Rubber Co.; Miller Rubber Co.; Wilkinson Process Rubber Co.; and United States Rubber Co. The exhibit of the latter company featured hard rubber piping and fittings, hard rubber tanks, soft rubber tank linings, hard rubber utensils, acid suction hose, etc.

Instruments for controlling time temperature pressures in chemical process were displayed by the Bristol Co., Waterbury, Conn. Hydraulic appliances were shown by The Watson-Stillman Co., New York, N. Y.

Of special interest to rubber chemists was a sample of the first synthetic rubber made from cracked gasoline exhibited in the booth of the American Chemical Society. This sample of rather soft consistency weighed possibly a quarter pound. Its color was creamy white and in parts was slightly streaked with brownish tint. Its recorded scheme of production was as follows:

			Ethylene	
			Propylene	
			Butenes	
			Butadiene	→ Synthetic
Gas oil	Gas	→	Residual gas	rubber
	Gasoline			
	Fuel oil			
	Residuum			

This sample was made by Benjamin T. Brooks, a New York chemist, and is the first synthetic rubber derived wholly from a petroleum source.

R. I. Wishnick, president of Wishnick-Tumpeer, Inc., 251 Front St., New York, N. Y., and its subsidiary companies, St. Louis Sulphur & Chemical Co. and the Century Carbon Co., is in Europe for a combined business and pleasure trip. He sailed on April 25 aboard the *Ile de France*, accompanied by Mrs. Wishnick.

Fayette M. Herrick, advertising manager for Taylor Instrument Cos., Rochester, N. Y., resigned to take up farming to improve his health. He will, however, continue with the company as editor of *Tycos-Rochester*. Elmer E. Way has been appointed his successor.

Fenner & Beane, 60 Beaver St., New York, N. Y., clearing members of the Rubber Exchange of New York, Inc., and members of the principal exchanges, announce the association of Clifford C. Johnston, member of the Rubber Exchange of New York, Inc., as rubber consultant, effective immediately. He is well known to the rubber trade in New York and abroad and was a partner in Dupire Brothers Rubber Department, Singapore,



C. C. Johnston

Straits Settlements, where he managed ten extensive rubber estates and engaged in the sale of crude rubber. For the last eight years Mr. Johnston has been head of the Johnston Rubber Co., 133 Front St., New York, representing important foreign rubber producing interests.

Martin Rubber Co., Inc., Long Island City, N. Y., according to Walter L. Tepper, president, recently installed an oil fired power unit. Recent advances in the volume of press work, particularly sponge rubber, that the company attained under the direction of vice president in charge of sales, John H. Evans, made it necessary to increase its facilities. Mr. Evans plans to travel through the Midwest very shortly to visit some of the company's distributors.

The Dunlop Tire & Rubber Co. recently moved its sales office from the plant at Buffalo, to 385 Gerard Ave., Bronx, both in N. Y. The sporting goods department is under the direction of T. J. McGrath, who has been with the firm several years.

Myron H. Clark, former president of the Tyer Rubber Co., Andover, Mass., and prominent in local industrials several years ago, has been selected vice president of the Reading Iron Co., Reading, Pa.

James Binder has been appointed manager of the Converse Rubber Co. branch, 101 Duane St., New York, N. Y., succeeding F. B. Nickel, resigned. Mr. Binder joined the Converse selling organization two years ago, being formerly with the Firestone company.

S. A. E. Calendar

The summer meeting of the Society of Automotive Engineers will be held at the Greenbrier Hotel, White Sulphur Springs, W. Va., June 14 to 19.

In conjunction with the National Air Races the 20th National Aeronautic Meeting of the Society of Automotive Engineers will be held at the Hotel Statler, Cleveland, O., September 1 to 3 inclusive.

The fall transportation meeting of the Society of Automotive Engineers is scheduled for November 10 to 12 at Washington, D. C.

The Doyle Gasoline & Oil Co., Rochester, N. Y., operator of twelve stations in the city and distributor for Texaco oil and gasoline in four New York counties, will now sell Goodrich tires, tubes, and accessories, according to an announcement by Edward J. Doyle, president of the company, and Joseph M. Scanlon, manager of Goodrich Silvertown, Inc., retail store of The B. F. Goodrich Rubber Co. in Rochester. Goodrich Silvertown, Inc., will continue its present operation in Rochester.

The Roessler & Hasslacher Chemical Co., Inc., 10 E. 40th St., New York, N. Y., at its annual directors' meeting elected the following officers to serve for the ensuing year: W. F. Harrington, chairman of the board; Hector R. Carveth, president; Mortimer J. Brown, vice president; Colby Dill, vice president and secretary; Milton Kutz, vice president; E. A. Rykenboer, vice president; Albert Frankel, treasurer; August Heuser, assistant treasurer; M. D. Fisher, E. A. Howard, and J. Carlisle Swaim, assistant secretaries. Several vacancies which occurred since the last annual meeting were filled. Both of the new vice presidents, E. A. Rykenboer and M. J. Brown, are from Niagara Falls and will continue to make their headquarters in that city. Colby Dill, the newly elected secretary, will make his headquarters in New York.

J. C. McQuiston, general advertising manager of the Westinghouse Electric & Mfg. Co., E. Pittsburgh, Pa., has announced his retirement, effective June 1, 1931. Gifted with a most pleasing and dynamic personality, and combining the abilities of analyst, speaker, and writer, Mr. McQuiston is probably the best known advertising executive in America. It is understood that in relinquishing his office with the Westinghouse company, Mr. McQuiston will start on an extended cruise around the world with his wife and his daughter.

The Bristol Co., Waterbury, Conn., announced the removal of its Pittsburgh branch office on May 1 to the Kopper's Bldg., 436 Seventh Ave., Pittsburgh, Pa. Telephone: Atlantic 1995-1996.

Paul Bertuch & Co., Inc., crude rubber importer, on April 18 moved from 24 Stone St. to the Maritime Exchange Bldg., 80 Broad St., New York, N. Y. Telephone: Bowling Green 9-6630.

NEW ENGLAND

Footwear production continues very light as manufacturers are determined to correct the overstocked condition of the industry. It is not expected that footwear output will reach normal levels until August. Mechanical goods manufacturers are operating on a curtailed basis. Rubber proofing is spotty; some specialty numbers outside of raincoat cloths account for most of the volume. Heel and sole production has kept up remarkably well, especially soles and soling sheets for cheap leather shoes.

Firestone Footwear Co., Hudson, Mass., announced that on May 1, W. L. Brunby succeeded W. C. McDermott as purchasing agent. The latter has returned to Akron, O., for other service with the Firestone Tire & Rubber Co. C. A. Goodnoh, former purchasing agent for the Clifton Mfg. Co., Jamaica Plain, Mass., has been appointed assistant purchasing agent in place of Mr. Brunby.

T. H. Freeman, for many years on the textile buying staff of the Hood Rubber Co., Watertown, has joined as purchasing agent, Security Mills, Newton, both in Mass., manufacturer of knitted cloths.

Golf has many adherents among rubber executives in Massachusetts. W. L. Brunby, purchasing agent of Firestone Footwear, tied for third place in the M. G. A. open at Marlboro on May 2 with an 81, considered a very good score because of the high wind. Jess Guilford won the match with a 77. Charles Davidson, sales manager of the Hodgman Rubber Co., Framingham, Mass., has a 7 handicap in the M. G. A. ratings for 1931 just announced. He is a member of Sandy Burr, Wayland, and was a member of the Albemarle team.

Robert Cowen, factory manager of the Appleton Rubber Co., Franklin, recently addressed the Rotary Club of North Attleboro, both in Mass., on "Rubber." He is a charter member of the Rotary at Franklin.

Arthur Newhall, vice president of the Hood Rubber Co., Inc., Watertown, Mass., recently returned from Europe.

"**Purchasing Essentials and Methods**," an evening course at Boston University School of Business Administration, recently was completed under the direction of Robert C. Kelley, purchasing agent of the Converse Rubber Co., Malden, Mass. Mr. Kelley conducted the afternoon conference of the New England Purchasing Agents Association on May 11 on "Problems in Buying Industrial Textiles." As chairman of the National textile committee, he will conduct the program at the National Convention in Toronto, Canada, June 8 to 11.

The City of Boston's purchasing methods in buying its rubber tires were recently aired in the press as the result of a complaint by the City Council. It was claimed that Boston was not receiving so favorable prices for their tires as was the State of Massachusetts. The Fisk Rubber Co., Chicopee Falls, Mass., has the state contract and is now the only concern making tires in Massachusetts.

National Association of Credit Men

A credit conclave of the representatives of the automotive, tire, and rubber industries, numbering about 40 credit executives, will be one of 22 credit group conferences which will feature the Credit Congress of Industry of the 36th annual convention of the National Association of Credit Men at Boston, Mass., June 22 to 27. The automotive, tire, and rubber session, under the chairmanship of Martin A. Campbell, credit manager of the American Motor Equipment Company of Boston, will meet with the other groups on Friday and Saturday, June 26 and 27.

Panther Rubber Mfg. Co., Stoughton, manufacturer of sport soles and heels known as Nu-Tone, Waverly, London Sport, and Button Crepe, affiliated with the Panco Rubber Co., Chelsea, both in Mass., is erecting an addition to its Stoughton plant, 100 by 250 feet. The building will be two stories in the front and one story in the rear. The one-story addition will be for pressroom purposes while the two-story will be for trimming, packing, and shipping. The plant has been operating on three eight-hour shifts for the past six months, and at the present time the former factory is inadequate for the increased volume of orders.

The Panco company is also erecting an addition to its plant at Chelsea, Mass., to take care of the increasing demand for its new composition soling, "Pan-crom Will Not Mark Floors." This factory has also been operating on a twenty-four-hour schedule.

Corone Wire Insulators, Inc., Putnam, Conn., makes super resistance, base wire covering mixtures, and also distributes the Johnson tubing and straining machines. E. H. Johnson is president of the company.

Boston Rubber Shoe Co., Malden, Mass., subsidiary of United States Rubber Co., has appointed Wesley H. Esty as custodian with complete charge of the property of the firm in the Fells and Edgeworth plants. He has been chief of the accounting department and has been connected with the firm for 16 years. The company also announced the termination of Leonard H. Goodhue's duties as superintendent.

A. Eugene Crooker, formerly in charge of production at the Boston Rubber Shoe Co., has been transferred to the plant of the United States Rubber Co., Naugatuck, Conn., from the Alice Mill, Woonsocket, R. I.

Some departments of the Alice Mill are being dismantled, and the changes will abolish the position of Freeman A. Patten, former foreman in the making room of the Boston Rubber Shoe Co.

Tyer Rubber Mutual Relief Association, Andover, Mass., held its annual meeting on May 4 and elected the following officers: President, Alexander Valentine; vice president, Robert Lockhead; secretary, James E. Smythe;

treasurer, Edwin Anderson; and directors, David A. Forbes, John F. Morse, and David M. Black. The treasurer's report showed the association to be in good financial standing, and a letter of appreciation was extended to the Tyer Rubber Co. for its support.

Merton A. Turner, vice president and sales manager of Stedman Rubber Flooring Co., S. Braintree, Mass., at a recent meeting held in New York, N. Y., was elected chairman of the Rubber Flooring Manufacturers' Division of The Rubber Manufacturers' Association.

The Fabric Fire Hose Co. has moved its sales offices, formerly located at 9 Park Place, New York, N. Y., to its factory at Sandy Hook, Conn.

The Fine Rubber Co., Inc., has recently been organized at Malden, Mass., with a capital of \$100,000, under the management of Israel L. Louis and Charles Fine.

Massachusetts Safety Council recently held its tenth annual state conference on industrial and public safety at the Hotel Statler attended by more than 500 plant engineers and executives. There were many safety appliances exhibited including the United States Navy's safety articles used in flying and deep-sea diving. Among the prominent speakers were Prof. Robert E. Rogers of the Massachusetts Institute of Technology, and Governor Joseph B. Ely.

Fisk Rubber Co., Chicopee Falls, Mass., through its receivers, Roland W. Boyden and Charles A. Dana, announced that the company was operating its plant on a basis of five days a week and intends to continue with this schedule. Operations for the first four months were conducted without loss. Indications are that earnings for the first six months of the year will be sufficient to absorb all expense, including depreciation, with inventories at current market values. Percy S. Gates, for the past 16 years in charge of the insurance department, Fisk Rubber Co., has resigned to become associated with the Frank M. Kinney agency.

United States Rubber Co.'s sundries warehouse has been moved from Naugatuck, Conn., to Providence, R. I., as a part of the new centralization program of this company. In the future, finished sundries manufactured at Naugatuck will be shipped by truck to the Providence terminal. The U. S. company starting June 1 will increase operations from three to five days a week in its Naugatuck plants.

A. F. Steeves, Farrel-Birmingham Co., Ansonia, Conn., was acting chairman of the publicity committee at the first annual Connecticut Safety Conference which was held at Hotel Taft, New Haven, last month. At this conference, T. W. Walker, of the Goodyear India Rubber Glove Co., Naugatuck, was a member of the program committee.

MIDWEST

U. S. Rubber Tire
Dept. Activities

C. L. Moody

C. L. Moody has been appointed factory manager of the main plant of the U. S. Rubber Co.'s tire department in Detroit, Mich., according to J. F. O'Shaughnessy, general manager of the department. He succeeds Earl L. Bryant, who will devote his entire time to special work in the coordination of tire factory operations. Mr. Moody, long experienced and well known in the industry, before assuming his present position, was tire factory manager of the Dominion Rubber Company, Kitchen, Ont., which is a subsidiary of the U. S. Rubber Co. Before joining the U. S. Rubber organization he was general superintendent of the Fisk Rubber Co.'s plant at Chicopee Falls, Mass.

Major B. J. Lemon, Lieut. N. E. McLaughlin, and Lieut. Herbert Poehle, of the U. S. Rubber Tire Department, last month attended the sessions of the motor transport school conducted at the Army Reserve Camp at Erie Ordnance Depot, Port Clinton, O. These executives are actively connected with the Detroit Procurement District Headquarters, Motor Transport Reserve.

George S. Shugart, long prominent in the executive establishment of the United States Rubber Co., retired after 35 years of unremitting and effective service with the corporation and its predecessors. He started with the old Morgan & Wright plant in Chicago and after training in the general offices and factory entered the sales department. In 1918 he was transferred to New York and in 1919 was made general sales manager of the United States Tire Co., and later elected second vice president of the U. S. Rubber, the parent corporation, and president of the tire company.

All twelve planes of the Century Line fleet, operating between Detroit, Toledo, Cleveland, Chicago, and St. Louis, are

equipped with U. S. Royal airplane tires. These planes, Stinson tri-motored ships, each seating ten passengers, with a heavy schedule to meet, have established an enviable record for meeting their schedule requirements.

Bickett Rubber Products Corp., Watertown, Wis., according to Vice President L. M. Bickett, has purchased the real estate, buildings, and rubber equipment formerly owned by the International Rubber Co., Anderson, Ind., and will move into the Anderson plant just as soon as the equipment is installed, which will be a gradual procedure to avoid interruption in operations. The company has operated in Watertown, Wis., for the past ten years. An analysis of sales, however, indicates that a plant at Anderson, Ind., will better serve the territory in which business was secured. To provide for the expansion of the company and new capital, the company has reincorporated under the laws of the state of Indiana, and Indiana corporation stock will be transferred to the holders of Wisconsin corporation stock.

Mishawaka Rubber & Woolen Mfg. Co., Mishawaka, Ind., because of not recognizing the union, had twenty-four hundred employees, including men and women, go on strike in sympathy with two cutters who were discharged. There are 330 men and women who did not strike.

National Tire Dealers' Association has selected Detroit as the location for the 1931 convention, the meetings to continue through November 16-18. This was determined at the meeting of the directors of the N. T. D. A. held in Cleveland on April 24 and 25, and which was attended by 13 and 15 officers and directors of the association.

The gathering of N. T. D. A. officials in Cleveland was also marked by a joint conference between the dealer representatives and executives of a group of tire manufacturing companies, the result of which was the development of a clearer understanding of each other's problems and the arrangement of a program which will insure the continuance of the cooperation of the manufacturers in the handling of N. T. D. A. affairs.

Norval P. Trimborn, secretary and manager, is making a Southern trip to organize local associations there.

Chicago Buys Hose Cheap

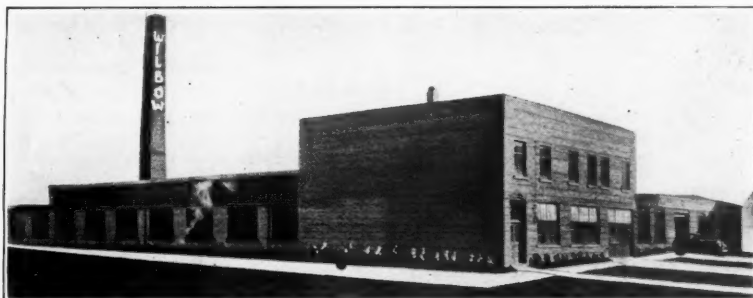
A large amount of 2½-inch, cotton-jacketed fire hose has been bought for the Chicago, Ill., Fire Department at 38 cents a foot, said to be an unheard-of low price for hose bearing the underwriters' label. The same size navy-specification hose sold lately in Los Angeles for 35 cents.

C. J. Tagliabue Mfg. Co., Brooklyn, N. Y., announces the opening about May 1 of a branch sales office at 2832 E. Grand Blvd., Detroit, Mich. Greatly increased business in this section has necessitated this change from a jobbing connection to a direct sales branch with ample stock of all TAG indicating, recording, and controlling instruments. H. W. Kerro is in charge of this office.

Link-Belt Co., Chicago, Ill., announces the appointment of William L. Hartley as district sales manager in charge of the Detroit territory. He has been with the company since 1915. From 1917 to 1919 he was with the United States Expeditionary Forces in France, rejoining the Link-Belt organization after his return from service. In 1926 Mr. Hartley was promoted to the General Sales Department, and in 1927 was transferred to the Kansas City office. Since 1928 he has been in charge of the Foundry Sales Division of the company. His new location will be 5938 Linsdale Ave., Detroit.

Sears, Roebuck & Co., Chicago, Ill., has introduced a new automobile tire called Allstate's Companion which has met very rigid tests. This addition gives this company four lines of tires. The Companion is offered in four-ply and six-ply construction. The side walls are of the same type as the Allstate tire, built to stand wear and tear against the curbs. A new center traction tread has been designed for the tire, which is made full size in every way and is larger than tires were formerly built. Its carcass consists of super-elastic cord fabric throughout. The large cavity for air has been provided for easy riding.

The Williams-Bowman Rubber Co., Cicero, Ill., the oldest manufacturer of mechanical rubber goods in the Chicago district, recently completed a substantial addition to its factory to take care of the constant growth and expansion into new lines of manufacturing. The organization was founded in 1903 by W. J. Williams and J. C. Bowman.



Enlarged Plant of The Williams-Bowman Rubber Co., Cicero, Ill.

PACIFIC COAST

Spring business in most rubber lines has been fairly good of late on the Pacific Coast even though mechanical goods have slowed down in the past few weeks. The general outlook, however, is regarded as excellent by most manufacturers and dealers. Even the rubber concerns which depend much on the oil industry, and which have been hard hit by the slump in oil production, are feeling more optimistic with the prospects for an early resumption of drilling and pumping. Oil operators' reserves of rubber goods are known to be practically depleted, and hence it should take but little additional activity in the oil industry to benefit markedly makers and dealers in rubber supplies.

Tire sales are steadily growing in seasonal volume, and the chances are that the total for the first six months of 1931 will be well above that for the first half of 1930. Distributors are much encouraged with the prospects, and some of the Coast factories are busy night and day trying to keep up with current demand. Unless some price-war starts—and there is no hint as yet of any such calamity—the season's profits are likely to be very fair.

Crude rubber importers report much demand of late for natural and concentrated latex from laboratories, and it is said that much experimenting is being done with it in making paints, varnishes, batteries, adhesives, and other articles.

That 1931 will be a good tire repair material year is forecast by increasing sales to many large handlers of such goods, among them being the Western Auto Supply Co., which operates a chain of 169 stores covering the west coast field as far east as Denver, and one of the major tire distributors in the country.

Pacific Goodrich Rubber Co., Los Angeles, Calif., had as a recent guest Vice President W. A. Means of the parent Goodrich company, Akron, O. He was on his way back home from the Orient and got his first glimpse of the big and busy Southwest plant under the guidance of Vice President Samuel B. Robertson, of the coast subsidiary company. Another recent visitor from the Akron plant was R. P. Dinsmore, well-

known rubber technologist. General Sales Manager Frank E. Titus is visiting in Akron, after having made a business trip covering Denver, Salt Lake City, and San Francisco. He found business prospects very encouraging in the cities he visited.

Goodyear Tire & Rubber Co., Los Angeles, Calif., has of late been giving special attention to aeronautical activities. Its blimp *Volunteer* in mid-May flew to San Francisco and also greeted Secretary of the Navy Adams at Sunnyvale, Calif., recently purchased by the federal government for its west coast airship base. On the way north the *Volunteer* was obliged to make a forced landing at Bakersfield as the result of two rifle shots piercing the gas bag and causing the loss of 10,000 cubic feet of helium. Gas was rushed to the disabled airship from the Goodyear factory in Los Angeles, and in two days the blimp was on its way.

Tire production is being steadily stepped up; so it is expected that by mid-summer the output of the Los Angeles plant will be close to the company's best records. Overtime is the rule in most of the departments. A new Tacoma, Wash., tire depot has been established. It is practically a sub-branch of the Seattle, Wash., branch and is in charge of M. M. Davis. G. B. Swarthout has been appointed manager of the Spokane, Wash., branch. He has had Goodyear branch experience in Denver and Seattle. Clyde S. Schetter of Akron, O., has been placed in charge of airship activities in Los Angeles. W. Disel has been placed in charge of advertising at the Los Angeles plant, taking the place of J. X. Kennelly, who has joined the Neon Electrical Products Co., Los Angeles.

Barkerubber Flooring Co., 1346 E. Slauson Ave., Los Angeles, Calif., which had been manufacturing general rubber mechanical goods and tire repair materials, has recently taken up the making of floor covering from inner tubes which are reclaimed by a unique process, and finds a large and growing demand from hotels, theaters, restaurants, ship-owners, and other users.

California Statistics

Official statistics for California indicate for April, 1931, a loss of 2 6-10 per cent in labor in the state's rubber manufacturing concerns as compared with April, 1930; a total payroll decrease of 11 per cent; and average weekly wages \$27.62, a decrease of 8 6-10 per cent. The figures are given for somewhat over 60 per cent of the state's wage-earners.

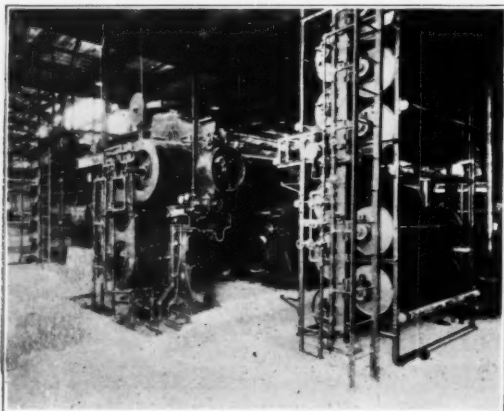
Firestone Tire & Rubber Co., Los Angeles, Calif., had as visitors in May President Harvey S. Firestone, Sr., and Vice President Harvey S. Firestone, Jr., of the parent company, Akron, O. They were escorted from El Paso by Vice President and General Manager R. J. Cope, and addressed the executives of the California organization at a luncheon given in their honor at the Los Angeles factory. They were also the guests of Henry M. Robinson, chairman of the board of the Security-First National Bank at a luncheon in the Chamber of Commerce attended by business and financial leaders. A. Schleicher, president of the Samson Tire Corp., and first vice president of the chamber, presided. The Messrs. Firestone gave interesting talks on the general industrial situation. A special radio address was given by Mr. Firestone, Sr., before leaving with his son for San Francisco and the Northwest.

There is much activity at the Firestone Los Angeles works, orders having shown a notable increase within the past month. All departments continue working on three shifts a day.

United States Rubber Co., Samson Division, Los Angeles, Calif., has been exceptionally busy for many weeks filling orders for tires and tubes, and officials say that no let-up is in sight. The latex-dipping apparatus and the supply tanks have finally been installed and are in full operation. The working schedule for all departments is three shifts a day seven days a week. Earl Bryant of the company's main tire factory in Detroit, Mich., has been spending several weeks in Los Angeles coordinating the operations of the factory in that city with the work of the company's other tire factories in the Midwest.

American Rubber Producers, Inc., through Vice President Frederic W. Taylor, treated the students of the University of Southern California at Los Angeles to a lecture with two reels of motion pictures on the company's guayule activities at Salinas, Calif., termed by the university's botany department the state's most unique industrial enterprise.

Radiant Rubber Co., 2012 E. 7th St., Los Angeles, Calif., which is one of the largest distributors of parchments and molded and dipped rubber on the Coast, is planning to establish a manufacturing plant in the near future. C. S. Hurt is manager.



One of the Four-Roll Calenders in the Pacific Goodrich Rubber Co.'s Plant in Los Angeles, Calif.

CANADA

General Asbestos and Rubber Division, Raybestos-Manhattan, Inc., finds the outlook for business on the Pacific Coast very good, being reflected in steadily increasing sales of brake lining, clutch facings, fan belts, packings, radiator hose, etc. Headquarters are at 366 Brannan St., San Francisco, Calif., and in charge of G. H. Mosel, Pacific Coast manager.

Golden State Rubber Mills, Inc., 1920 E. Vernon Ave., Los Angeles, Calif., will, it is expected, soon have its fiscal affairs cleared up and resume operations under a different name at 571 E. 61st St. The plant had up to about a year ago done a profitable business in making staple and special rubber mechanical goods, Emmet S. Long, head of the concern, has been in England the past two years manufacturing rubber goods for the European oil trade.

Rubbercraft Corp. of California, Ltd., 110-112-114 E. 17th St., Los Angeles, Calif., according to President Charles N. Merralls is the new name of the company formerly known as the Eno Rubber Corp. The company specializes in mechanical molded goods of all kinds and is the manufacturer and originator of the well-known line of OSO-Soft pneumatic air cushions and mattresses. Its factory is located at 220th St. & Border Ave., Torrance.

Industry and Trade

From Report of National Industrial Conference Board

April production of cars and trucks is estimated at 349,000 units, showing an increase of 21 per cent over March but a decline of 25 per cent below April last year. In recent years the March to April upturn has been about 5 per cent. The output during the first four months decreased 31 per cent below last year and 36 per cent below the five-year average.

Sales of new passenger cars as measured by new registrations in March showed an increase of 51 per cent over February. However sales dropped 33 per cent below March last year, and sales for the first quarter were likewise 33 per cent under a year ago.

Foreign sales during March registered an increase of 35 per cent over February, but remained 33 per cent under March, 1930, level. Foreign sales during the first three months were 37 per cent less than the same period a year ago.

Stocks of new cars in the hands of dealers on April 1 were approximately 28 per cent less than a year ago.

Crude rubber consumed in April amounting to 33,320 long tons increased 1.6 per cent over consumption during March; there is normally no change in the quantity of rubber consumed in these two months. Rubber consumed in April was 17 per cent under the amount consumed in April, 1930.

Stocks on hand at the end of the month increased 5 per cent to a total of 228,380 long tons, while a 1 per cent increase is usual. Stocks are 54 per cent greater than they were a year ago.

Peak sales of garden hose may be reached much earlier this spring than has been the case for a good many years, not only in the prairie provinces, but throughout all Western Canada. Reports show a great many lawns were winter killed through lack of snow protection; consequently much work and equipment will be necessary to rebuild them. Continued activity in the various centers of the Dominion, therefore, is expected for some weeks. Sales are fairly well distributed between standard and corrugated grades although in some quarters standard is a little more active. No change has been made in garden hose prices since the booking season.

Irregularity in the prices agreed upon for rubbers has been reported. Just how far this movement will spread no one is prepared to say, but it seems to have arisen out of a cooperative buying program in certain parts of the country. The offering of concessions has got to be much more general than merely the groups embraced in cooperative buying. The movement, however, does not seem to have been extended to other rubber footwear.

Panther Rubber Co., Ltd., Sherbrooke, P. Q., this year finds its products, Waverly soles and heels for women, misses, and children, and Nutone soles and heels for men and boys, figuring more prominently in the manufacture of sport footwear than ever before.

Woodstock Rubber Co., Woodstock, Ont., featured a giant rubber boot in the lobbies of the Royal York Hotel, Toronto, Ont., and the Hotel London, London, Ont., where the company recently displayed its samples.

The production of crude petroleum during April, 1931, increased 8 per cent over March's level and amounted to approximately 2,400,000 barrels daily; an increase of 2 per cent is usual. Output in April was 175,000 barrels per day less than the average for April, 1930.

Stocks of crude petroleum on April 1—the latest date for which figures are available—were 398,679,000 barrels as compared with 430,867,000 barrels on April 1, 1930, indicating a decrease of over 32,000,000 barrels during the year.

Domestic demand for gasoline during the first quarter of 1931 increased 2.46 per cent over the first quarter of 1930. Gasoline stocks at refineries on April 1, were 47,773,000 barrels, indicating a decrease of approximately 7,500,000 barrels from the 55,228,000 barrels in storage on April 1, 1930.

Stocks of gasoline at the end of April are estimated to have shown a 4 per cent decline.

AN EMPLOYEE HAD HIS LEFT ARM CAUGHT in a tread machine as he attempted to keep tread from going through. As the result he was disabled for 14 days. *Rubber Section News Letter*, N. S. C.

Dominion Rubber Co., Ltd., Montreal, P. Q., stockholders recently held their annual general meeting, routine in character. Reports were adopted, and the board of directors reelected without change. In answer to a shareholder's question, President W. A. Eden, who acted as chairman of the meeting, said that the depreciation account at the end of March was \$5,000,000, about one-third of the gross value of the fixed assets. The Dominion company recently introduced four new rubber products: baby pants, baby bibs, crib sheets, and aprons. Special rubber compounds and careful designing of smart patterns and color effects give them real sales appeal. The company expects to market shortly a new hot water bottle in new designs and colors.

J. W. Green, of the Dominion company, at the recent annual general meeting of the Quebec Division of the Canadian Credit Men's Trust Association was elected a member of the board of governors, as well as chairman of the trade clearing bureau committee. Mr. Green automatically sits as a member on the same national committee of which he is a divisional member.

C. D. Rollins, western sales manager of the Seiberling Rubber Co. of Canada, Ltd., whose headquarters are at Toronto, Ont., during a recent visit to Vancouver, B. C., stated that his company plans to establish a factory branch in the Terminal City to handle its own distribution direct. He also announced the appointment of T. A. Treacy, 518 Beatty St., Vancouver, as factory representative of this company for the interior of British Columbia.

Harold C. Deeton, of the Dunlop Tire & Rubber Goods Co., Ltd., Edmonton, Alta., branch, was recently elected for a two-year term to the board of the Canadian Credit Men's Trust Association, at the election of officers and the presentation of the annual reports held in Edmonton.

Canada Wire & Cable Co., Ltd., Montreal East, P. Q., is expected to be in operation by June 1.

The North British Rubber Co., Ltd., Edinburgh, Scotland, with a Canadian branch in Toronto, Ont., will soon release an advertising campaign featuring North British, Falcon, and Hawk golf balls.

Firestone Tire & Rubber Co. of Canada, Ltd., Hamilton, Ont., is conducting an advertising campaign for Firestone Hi-Speed Tires.

C. H. Carlisle, president and general manager of the Goodyear Tire & Rubber Co. of Canada, Ltd., New Toronto, Ont., and also president of the Toronto Board of Trade, will officially welcome the delegates to the 1931 convention of the Canadian Credit Men's Trust Association to be held in Toronto from June 8 to 11.

Tires and Batteries is a new periodical for the Canadian trade. Vol. 1, No. 1, appeared in April, 1931, from Wrigley Publications, Ltd., Toronto, Ont., publisher of six other business papers.

FINANCIAL

Samson Corp.

Samson Corp. preferred and common stock has been listed on the Los Angeles Curb Exchange. Its predecessor was Samson Tire & Rubber Corp., controlled by United States Rubber Co. The listing covers 165,010 shares of 5 per cent \$10 par value preferred stock and 99,503 shares of no-par value Class B common. All of Class A common is owned by United States Rubber Co. The time limit for the exchange of shares of the old company for the new expired May 28, 1931.

Raybestos-Manhattan, Inc.

Raybestos-Manhattan, Inc., during the quarter ended March 31, 1931, earned \$241,203.84, or 35 cents per share on the 676,012 shares outstanding, after providing \$137,295.58 for depreciation of buildings and machinery, and \$35,075.28 for federal and state income taxes, as compared with an operating loss for the quarter ended December 31, 1930, of \$95,206.22. In the quarter ended March 31, 1930, the net earnings were \$450,975.73, or 67 cents per share.

The balance sheet at the end of March showed current assets of \$8,500,788.86, including cash, municipal bonds, and other marketable securities of \$3,164,914.76, and current liabilities of \$732,813.46, a ratio of 11½ to 1. The company has no bank loans, funded debt, or other capital obligations, other than its common stock.

The directors declared the usual quarterly dividend of 65 cents per share, payable June 15, 1931, to stockholders of record May 29, 1931.

New Incorporations

Brewster Rubber Corp., Apr. 27 (N. Y.), capital stock 100 shares, no par value. E. A. Michaelson, 950 Hoe Ave., Bronx, B. Laiken, 1452 Sterling Pl., and E. Koteen, 951 Carroll St., both of Brooklyn, all in N. Y.

Casson, Austern Corp., (N. Y.), capital stock \$20,000, par value \$50. C. and H. Austern, both of 512 Grove St., Far Rockaway, and M. Casson, 2076 Wallace Ave., Bronx, all in N. Y. Waterproof material.

General Insulated Wire Co., Feb. 25 (R. I.), capital stock 1,000 shares common stock, no par value. S. Chiappinelli, 478 Broad St., and E. Snider, care of Biltmore Hotel, both of Providence, and D. H. Morrissey, Barrington, all in R. I.

Georger Tire Co., Inc., (N. Y.), capital stock 200 shares, no par value. M. N. Baker, L. C. Davis, and C. J. Townsend, all of 1526 Liberty Bank Bldg., Buffalo, N. Y. Tires and accessories.

Joseph Kaplan, Inc., (N. Y.), capital \$50,000. H. Olderman, M. Rosenbloom, and C. Rubin, all of 291 Broadway, New York, N. Y. Rubber products.

Martin Cord Tire Export Corp., (N. Y.), capital \$20,000. J. Martin and M. H. Lakopolanski, both of 161 W. 64th St., and F. Machlin, 225 Fifth Ave., all of New York, N. Y. Tires and tubes.

Newark Tire & Rubber Co. of N. J., Apr. 23 (N. J.), capital stock 1,000 shares, no par value. T. J. and J. E. Lane and J. V. Caulfield, all of 516 Bergen Ave., Jersey City, N. J. Manufacture tires, tubes, etc.

Nopinsal Rubber Corp., (N. Y.), capital stock 200 shares, no par value. I. J. Jaffe, 19 Hastings St., and W. Goldstein and J. G. Jaffe, both of 3114 Avenue I, all of Brooklyn, N. Y. Rubber goods.

Frank A. Roberts Co., Inc., (N. Y.), capital \$5,000. M. R. Roberts, 312 Holland St., W. S. Murphy, 104 Beverly Rd., and J. A. Berson, 1301 E. Genesee St., all of Syracuse, N. Y. Rubber goods.

E. Root Tires, Inc., (N. Y.), capital \$20,000. E. and E. A. Root, both of 23 Maynard Ave., Eggertsville, and C. L. Newman, 827 McKinley Parkway, Buffalo, all in N. Y. Rubber goods, tires, etc.

Wellger Garment Co., Inc., Apr. 24 (N. Y.), capital 200 shares, no par value. S. H. Montfort, 427 Huntington Ave., J. A. Martin, 195 St. James Pl., and C. H. Wellman, 225 Anderson Pl., all of Brooklyn, N. Y. Rubber specialties, etc.

Rubber Exchange Elects Governors

Harry A. Astlett, of the firm of H. A. Astlett & Co., has been elected a member of the Board of Governors of The Rubber Exchange of New York, Inc., to serve the unexpired term of Hutcheson Page, resigned. Clinton T. Revere, of Munds & Winslow, has been elected Governor to serve the unexpired term of Jerome Lewine resigned.

The board of governors has decided to keep the exchange open to trading on Saturdays during June, July, August, and September.

Dividends Declared

Company	Stock	Rate	Payable	Stock of Record
Aetna Rubber Co.	Pfd.	\$1.75 q.	July 1	June 15
Baldwin Rubber Co.	Class A	\$0.37½ q.	June 3	May 20
Boston Woven Hose & Rubber Co.	Pfd.	\$3.00 s. a.	June 15	June 1
Boston Woven Hose & Rubber Co.	Com.	\$1.50 q.	June 15	June 1
Faultless Rubber Co.	Com.	\$0.62½ q.	July 1	June 15
Midwest Rubber Reclaiming Co.	Pfd.	\$1.00 q.	June 1	May 31
Phillips Rubber Soles, Ltd.	Ord.	5%	June 1	
Phillips Rubber Soles, Ltd.	Pfd.	3¾%	June 1	
Plymouth Rubber Co.	Pfd.	\$1.75 q.	Apr. 15	
Raybestos-Manhattan, Inc.	Com.	\$0.65 q.	June 15	May 29

Foreign Trade Information

For further information concerning the inquiries listed below address United States Department of Commerce, Bureau of Foreign and Domestic Commerce, Room 734, Custom House, New York, N. Y.

NUMBER	COMMODITY	CITY AND COUNTRY
†51,220	Bathing caps and shoes, aprons, and children's clothing	Santiago, Chile
†51,221	Bathing caps	Montreal, Canada
*†51,223	Mechanical goods	Stockholm, Sweden
†51,227	Sport goods	Shanghai, China
†51,238	Sport goods	Guadalajara, Mexico
†51,292	Bath shoes and slippers	Barcelona, Spain
†51,296	Reclaimed rubber, hard rubber goods, and rubberized fabrics	Paris, France
†51,361	Thread	Milan, Italy
†51,362	Galoshes	Hamburg, Germany
†51,363	Bathing caps and slippers	Bogota, Colombia
†51,422	Water hose and bathroom mats	Amsterdam, Netherlands
*†51,437	Casings and inner tubes	Copenhagen, Denmark
*†51,456	Retreaded tire casings	Sao Paulo, Brazil
†51,512	Shoes, bathing caps, seashore toys, and tires	Nantes, France
†51,513	Belting	Athens, Greece
†51,514	Hospital sheeting, syringes, rubberized fabrics, etc.	Milan, Italy
†51,515	Tennis shoes	Tangier, Morocco
†51,519	Druggists' sundries	Rio de Janeiro, Brazil
*†51,521	Surgical gloves	Prague, Czechoslovakia
†51,523	Tennis and golf equipment sport goods	Toronto, Canada
*†51,551	Tires and tubes	San Francisco, Argentina
*†51,563	Floor tiling	Montreal, Canada
*†51,585	Balloons	Rosario, Argentina
*†51,598	Belting	Alexandria, Egypt
*†51,655	Bathing shoes, caps, and belts, and dress shields	Frankfort, Germany
*†51,722	Tires and inner tubes	Lublin, Poland
*†51,723	Caps	Paris, France
*†51,725	Hose	Cairo, Egypt

*Purchase. †Agency. *†Purchase and agency ‡Either.

Foreign Trade Circulars

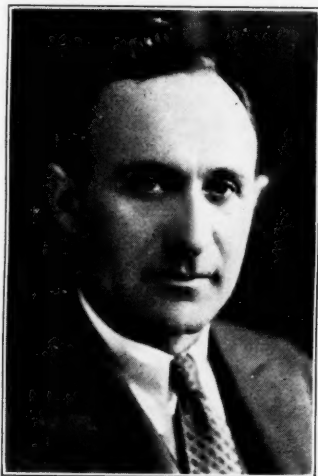
Special circulars containing foreign rubber trade information are now being published by the Rubber Division, Bureau of Foreign and Domestic Commerce, Washington, D. C.

NUMBER	SPECIAL CIRCULARS
2970	French tire exports, February, 1931.
2971	French footwear exports, February, 1931.
2972	British exports of automobile casings, February, 1931.
2973	British exports of footwear, February, 1931.
2974	Italian tire exports, calendar year, 1930.
2975	German tire exports, calendar year, 1930.
2976	Belgian tire exports, January, 1931.
2979	Preliminary statistics of dealers' stocks of automobile tires, April 1, 1931, United States.
2980	Gutta percha production in the Netherlands East Indies.
2981	Exports of machinery belting (other than leather) from United Kingdom, calendar year 1930.
2983	Monthly Japanese exports of tires.
2984	Comparative exports of solid tires from the United States, Canada, United Kingdom, Germany, Italy, and France, calendar year 1930.
2992	Canadian tire exports, March, 1931.
2993	Canadian tire exports, first quarter, 1931.
2994	Final report of distributors' tire stocks in the United States, April 1, 1931.
2995	Canadian exports of footwear, first quarter, 1931.
2996	Canadian exports of belting and hose, first quarter, 1931.
2997	British exports of footwear, March and first quarter, 1931.
2998	British exports of automobile casings, March and first quarter, 1931.
2999	French tire exports, March and first quarter, 1931.
3000	French footwear exports, March and first quarter, 1931.
3001	Dutch restrictionists organize new association.

THE OBITUARY RECORD

Hunt for Kaufman Is Ended

THE finding of the body of Mitchell B. Kaufman, missing president of the Converse Rubber Co., Malden, Mass., ended the six-month search which had been going on for him in Maine and Quebec. At the inquest it was determined that his death was due to privation and exposure.



Blank & Stoller, Inc.

Mitchell B. Kaufman

He was born 37 years ago in Lawrence, Mass., and was educated there. Immediately upon his graduation from the Massachusetts Institute of Technology in 1915, he became affiliated with a Framingham rubber company. Within a few years he was acknowledged as one of the foremost rubber experts in the country. Mr. Kaufman later became president and principal owner of the Hodgman Co., Framingham, Mass., and president of the Archer-Straus Rubber Co., New York, N. Y. Not long after he joined the Converse Rubber Co., Malden, Mass., where he gradually worked his way into the presidency.

Mr. Kaufman leaves five heirs-at-law. They are his mother, his brother, and three sisters.

Teacher and Industrialist

THE death of William T. Rodenbach, president of the Naugatuck Mfg. Co., and for many years treasurer of the Goodyear Metallic Rubber Shoe Co., and the Goodyear India Rubber Glove Co., all of Naugatuck, Conn., on May 6, came as a blow to his host of friends. Mr. Rodenbach, identified with Connecticut industries for over forty years, was 76 years old.

He was born in New York City, September 19, 1854, and educated in the public schools and in the College of the City of New York. On his graduation in 1874 he taught school so successfully that he became a principal two years later and retained that position for ten years. Since he entered the employ of Goodyear Metallic Rubber Shoe Co. in 1886, he had been an important factor in the management of this concern.

Mr. Rodenbach was interested also in



Wm. T. Rodenbach

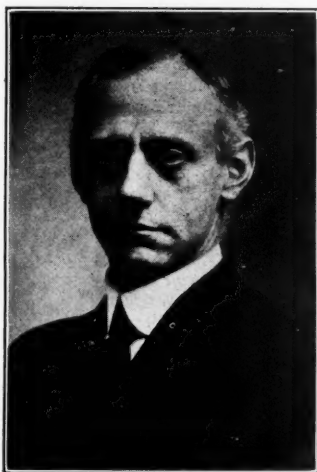
banking and municipal government, and for three years he was Mayor of Naugatuck. For twenty years he served as president of the Board of Education. He had also been trustee and vice president of the Naugatuck Savings Bank, and president of the Naugatuck Mfg. Co.

His interests extended at the same time to social and fraternal activities. He was a thirty-second degree Mason, a member of the Rubber Reclaimers Club of New York City, the Graduates Club, New Haven, Conn., and the Delta Upsilon fraternity. He is survived by his widow and three children.

Treasurer of Combination Company

IT IS with the deepest regret that we announce the death of Fred L. Conover, treasurer of the Combination Rubber Manufacturing Co., Trenton, N. J., on April 23. Mr. Conover joined the Combination company in 1905, and became its treasurer several years ago.

He was born on October 2, 1873, near



Fred L. Conover

Hopewell, N. J., and graduated from the Stewart Business College. His connection with the rubber industry started at about the age of eighteen when he joined the Globe Rubber Co., Trenton, and remained with it when it was sold to another to become the United & Globe Rubber Co.

Mr. Conover was a member of Bloomfield Lodge No. 40 F. & A. M., and Trenton Lodge No. 3 I. O. O. F.

Well-Known Twemo Executive

THE passing of Thomas Johnson Wetzel at his home in New York on April 22 marks the end of another of the old standbys, who



Thomas J. Wetzel

came from the bicycle business, while still youthful, and lived and worked to see motor cars become the largest business the world has ever seen. At the time of his death, Mr. Wetzel was vice president, treasurer, and a director of the Twemo Corp., New York, which he had formed with John V. Mowe.

"Tom" Wetzel, as he was intimately known, was born in Dayton, O., in June, 1867. Although his interests were extended in a number of directions, he was known principally as a manufacturers' agent. Years ago he was president of the Wetzel-Hall Co., then vice president of the Buffalo Pressed Steel Co., and later head of the Steel Wheel Co. With Edgar B. Fraser he formed the Wetzel-Fraser Co., to sell textiles. 'Wheels, Inc., of which Mr. Wetzel was chairman, he organized with John P. Cramer. The Twemo Corporation was organized as the sole licensees of the Fairchild patents, covering the Fairchild inner tube machine and process.

Mr. Wetzel, who was in the trade for 30 years, served repeatedly in association work, as vice president of the old Motor and Accessory Manufacturers' Assn., and later as its secretary and assistant treasurer. His counsel was widely sought for its shrewdness and the broad knowledge of the business and the men who run it.

We extend our sympathy to the widow and two daughters who survive him.

Interesting Letters From Our Readers

Copper in Proofed Goods

TO THE EDITOR: Much controversy has taken place in England of late in regard to the amount of copper permissible in cloths for making waterproof garments without invalidating the proofers 2-year guarantee. In actual practice a guaranteed proof means that the proofer assumes liability for any decomposition in the rubber proofing within a period of 2 years, except where analysis proves that copper is present to more than a very limited percentage.

Independent research has endeavored to limit .007 per cent as the maximum amount of copper in cloth which has been proofed by the cold process. The dyers have not accepted this standard but are prepared to accept a standard of .01 per cent.

It is of interest to note the much lower copper percentage permitted by American proofers; namely, .001 per cent as shown by analysis. Similarly there is a difference between English and American proofers in their respective maximum grease allowance in cloth. In English practice 2 per cent is recognized as standard without being definitely specified; while in America 1 per cent of grease is the limit allowed.

These discrepancies seem excessive. Do they reflect on English rubber technology?

MANUFACTURER.

April 25, 1931.

The above interesting letter refers to the percentages of copper and grease allowed in a fabric under the Recommended Commercial Standard for Cotton Goods for Rubber and Pyroxylin Coating, TS-1365, issued by the Bureau of Standards.

In this connection it is certain that American rubber proofers can and do purchase cloth for rubber coating that contains no more than .001 per cent copper. This is verified by the fact that the cloth manufacturers accepted the standard in which the specification covering the copper content is incorporated.

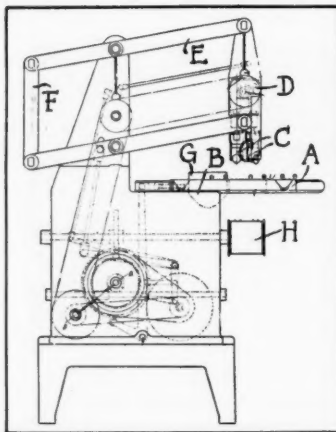
For about a year the Rubber Proofers Division of the Rubber Manufacturers Association has used a specification covering cotton grey and colored fabrics for rubberizers which permits a maximum quantity of .002 per cent copper, and 1 per cent grease in cloth to be acid cured, and 3½ per cent in fabrics to be heat cured.

THE EDITOR.

Painting Golf Balls

THE machine illustrated is a recently patented means¹ to perform automatically the whole or part of an operative cycle of golf-ball painting. This includes bringing the balls into contact with holders or grippers, gripping the balls, immersing them in paint, removing them from the paint, spinning them to remove surplus paint, and freeing them from the grippers.

The apparatus operates on eight balls at a time. Its framework carries a tray *A*, bearing a platform with anchorages for



Golf Ball Painting Machine

unpainted balls, and a container *B* for paint. Above the tray grippers *C* are carried by a head *D* mounted on a pivoted linkage *E* and *F*.

In operation, the balls are placed by hand on the anchorages; the tray then slides inward until the balls are positioned directly beneath the grippers. The descending head permits the grippers to pick up the balls, which are raised and remain so while the tray moves outward to bring the paint container under the balls.

The head again descends; the balls are immersed and slowly rotated in the paint. The head then rises slightly to bring the balls into cells *G*, where they are spun rapidly to remove surplus paint. The head then rises still farther, and the tray again moves outward; the grippers *C* descend and deposit the balls on a continuous conveyor *H*, which removes them for drying.

Abrasion Testing of Rubber

A SYMPOSIUM on abrasion testing of rubber will feature the thirty-fourth annual meeting of the American Society for Testing Materials to be held at The Stevens, Chicago, Ill., June 22-26. The symposium, scheduled for June 23, will comprise the following program.

"Study of a Test for Tear Resistance of Vulcanized Rubber Compounds," by Arthur W. Carpenter and Z. E. Sargiason. In this paper comparison is made of tear resistance, abrasion resistance, and stress-strain tests.

"Abrasion Tests of Vulcanized Rubber Compounds Using an Angle Abrasion Machine," by J. L. Tronson and Arthur W. Carpenter, describes machines and test methods, including data on the effect of variations in load, speed, temperatures, size of test specimens, and results of road tests.

"A Device for Measuring the Work Done in Punching a Small Rubber Cylinder, from a Test Sheet," by H. A. Depew, S. L. Hammond, and E. G. Snyder. The apparatus used, the results, and the conclusions to be drawn will be described.

"Abrasion Testing of Rubber with Bureau of Standards Type Machine," by W. E. Glancy, describes results obtained and presents data showing agreement between curves obtained by tensile tests and abra-

sion method, and between road and machine tests.

"Comparative Tests on Four Abrasion Machines," by C. A. Klamann. The machines have been developed by four companies interested in rubber, and this paper will compare relative costs, reproducibility of the tests, and indicate the correlation with service.

In addition to these papers leading rubber technologists will discuss related subjects which will be incorporated in the reports of the session. Provision has been made to allow ample time in which to bring out the discussion. Chemists and engineers who cannot attend the sessions and who wish to present discussions should give them in writing to Secretary-Treasurer of the A. S. T. M., Philadelphia, or to H. S. Depew, the New Jersey Zinc Co., Palmerton, Pa., or to Arthur Carpenter, The B. F. Goodrich Co., Akron, O.

Subjects which will definitely be brought up for discussion are: notes on the correlation of service with laboratory tests; notes on unusual service conditions and results; design of an ideal abrasion machine; tearing and cutting tests and their value in determining abrasion resistance.

Reducing Heat in a Tuber

A N effective and unusual means for preventing overheating of rubber in screw-type extruding machines was announced in a recent patent.¹

The invention involves the discovery that by circulating steam within the screw and the throat of a tuber, friction between the surface of the screw and the rubber compound is greatly reduced. At the same time back pressure upon the stock, created by friction within the throat of the machine, is held at a minimum value. Thus the compound is advanced more rapidly through the machine, and the kneading action upon the compound between the surfaces of the screw and cylinder is reduced. Therefore, contrary to what would naturally be expected, increase in the temperature of the screw results in a reduction of the temperature of the stock passing through the die of the machine.

This method differs radically from the customary cooling method whereby the heat of friction is reduced by circulation of water through the screw and the body of the cylinder.

The employment of steam of relatively high temperature in the screw apparently results in the local heating of the stock which comes into contact with the screw. As a result a film of rubber next the screw is so softened as to cause it to act as a lubricant between the main body of the stock and the surface of the screw. Because of the relatively low coefficient of heat conductivity of the rubber the heat from the screw does not have time to penetrate the mass of the rubber to any appreciable degree.

This lubrication of the contacting surfaces greatly reduces the friction between the screw and the stock, thus preventing excessive screw surface friction and kneading of the stock as it passes through the cylinder to the die.

¹British Patent, No. 333,973, Oct. 15, 1930.

¹U. S. Patent No. 1,800,180, Apr. 7, 1931.

Rubber Industry in Europe

GREAT BRITAIN

British Rubber Statistics

There is no doubt that the import duty on tires has been a boon to the British tire industry. While tire imports have dwindled yearly until in 1930 they represented a value of £435,503 for all types, or 10 per cent of the total value of rubber goods imports, the value of tire exports of all kinds in the same year had risen to £4,469,502, or more than 55 per cent of the total value of rubber goods exports. At the same time it is to be noted that the decrease in value of imports of tires as compared with 1929 came to 29 per cent, while exports increased 6 per cent. In fact Great Britain can actually show an increase in the export of tires in 1930.

There have been noteworthy changes in the importance of the markets for British tires during the year. Thus France, once the leading exporter of tires, in 1930 figures as the leading market for tires from England, the number imported by her having been 107,305, against 36,134 in 1929 and 27,291 in 1928.

India, which for many years had been Britain's best customer for tires, took second place, the number imported having been 98,959 in 1930, against 109,295 in 1929 and 114,582 in 1928. New Zealand, which had been a very close second to India in 1929, was fifth in 1930 with 87,601 tires, against 109,263 in 1929 and 55,070 in 1928. There has been a rapid increase in exports to Italy, which was third on the list in 1930. But this is because a large part of the tires were shipped there by an American subsidiary operating in England for distribution to neighboring consuming territories. Good increases were noted in the shipments to Irish Free State, which came fourth, to Netherlands, Belgium, Czechoslovakia, Sweden, Poland, Switzerland, Netherlands East Indies, and Roumania.

The British footwear exports during 1930 were not so favorable, having been 256,876 dozen pairs against 343,786 dozen pairs in 1929, or a decrease of 25 per cent; while imports increased from 1,045,769 to 1,234,405 dozen pairs or by 19 per cent. South Africa, which in 1928 and 1929 had headed the list of importers of British rubber footwear, fell to third place with a decrease of 59 per cent; Argentina, which in 1928 imported 7,995 dozen pairs and in 1929, 29,088 dozen pairs, took only 24,781 dozen pairs, a decline of 25 per cent. The Irish Free State topped the list with 39,518 dozen pairs, against 38,904 dozen pairs the year before. British India shows a considerable decline, the 1930 totals having been 8,117 dozen pairs against 22,998 dozen pairs in 1929 and 22,809 dozen pairs in 1928. On the other hand yearly increases are shown in the shipments to France, Spain, Belgium, Chile, and French West Africa.

Exports of rubber and balata belting, chiefly to South Africa, Sweden, and Norway, fell from 31,779 cwts. in 1929 to 27,444 cwts. in 1930, a decrease of 14 per cent; while the imports, chiefly from the United States, declined from 8,765 cwts. in 1929 to 8,083 in 1930, or 8 per cent.

Sponge Rubber Exhibition

An exhibition of sponge rubber products was recently held in London, which gave a very good idea of the variety of uses to which sponge rubber can be put. There were the new upholstered chairs, settees, etc., for use in the home; it seems that the demand for this type of furniture is increasing. Samples of upholstery as used by railway and street car companies, in picture houses and theatres, by motorists and in ambulances, for dental chairs and for mattresses in gymnasiums, were all on view. There were flooring and underfelts for carpets, besides a variety of specialties including bath sponges. Kneeling mats and hammocks in which radio microphones are suspended completed this attractive exhibition.

Rubber Recovery Remote

"Frankly, I consider the prospects of a genuine recovery in the rubber market remote," was the opinion given by Col. J. Sealy Clarke, well known in rubber circles here, in an interview published in the *London Rubber Age*.

The reasons for this opinion? Adjustment of supply to demand can only be effected by a radical reduction of the world's supply of raw material, or such an expansion of consumption as conditions of international trade today hardly warrant. With regard to the expansion in the demand for rubber, America still holds the key to the situation.

Col. Sealy Clarke does not believe there is unlimited scope for extension of road transport outside of America. There will be expansion in road transport in Great Britain and the Continent, but on much more restricted lines than in America. He considers it fantastic to assume that road transport can be developed in Europe and England to the point where, as in the United States, there is one car to every five persons. Conditions in America are exceptional. However in Russia, the Far East, and the British Colonies, the conditions more nearly resemble those of America; but here highway facilities must come first, to say nothing of raising the buying power of the people.

Col. Sealy Clarke declared that while tires must continue to be the dominant factor in rubber consumption, there are great possibilities in other directions, for instance rubber upholstery.

"Any tendency to optimism, however," he

continues, "must be tempered by the growing menace of cheap imports at price rates which cannot be approached by our scale of manufacturing costs. The competition of Continental goods produced by underpaid labor has been bad enough, but now, with Japan beginning to dump large rubber consignments on our home markets, we cannot hope to put up an effective resistance—except by way of import duties on cheap foreign goods. That seems to me to be the only way to restore any degree of equilibrium and to enable British labor to be employed at a reasonable remuneration."

Effect of Stop Lists

As the *India Rubber Journal* points out, the stop lists of tire manufacturers to check dealers who indulge in cutting prices frequently are greeted with much cynicism at dealers' meetings, it being remarked that even after having been fined and paying costs, price cutters have still been able to get supplies and continue their unfair competition. However two recent cases of bankruptcy were definitely attributed to the fact that manufacturers had ceased to supply tires. One bankrupt stated that after he was put on the list he could not get further supplies and so was driven out of successful business. In another case it was further admitted that costs in connection with breach of contract had been among the causes of failure. The tire stop lists, therefore, apparently do get their man in the end.

Dunlop Rubber Report

The net profits of the Dunlop Rubber Co., Ltd., over the past business year amounted to £541,424, as compared with £1,576,585 the year before. The interim preference dividend had already been paid, as well as the interim ordinary dividend amounting to 6 per cent less actual income tax. A final dividend was paid on the preferred shares but not on common. Considering the world wide depression, sales were well maintained, but the bad credit position and unfavorable exchanges have for the time being turned a once profitable business into a losing one.

As to the subsidiary companies, it is reported that though the Far East group of companies felt directly the effects of the reduced purchasing power of those markets caused by the heavy drop in the value of tin, rubber, and silver, profits were made by all the companies except the Dutch East Indies company, which incurred a small loss.

Record sales were booked by the French company and a satisfactory profit realized. On the other hand the German company was adversely affected by the economic conditions in the country, which resulted

in a reduction of selling prices and a slight loss; while the industrial crises in America and Canada caused a severe setback to the company in those countries. The Dunlop Perdriau company in Australia suffered severely for similar reasons.

The rubber plantations earned a profit sufficient to cover their full preferred dividend, and costs were reduced, while the yield per acre was increased.

At the annual meeting of Dunlop Rubber Co., Ltd., Sir Eric Geddes, chairman, stated that the company's plantations are producing rubber at the lowest costs ever attained. Average f. o. b. cost in 1930 was 4.49 pence per pound, while in 1931 the estimated cost will be slightly over 3 pence per pound.

In conclusion it is stated that the company had fully maintained its standing in the home market and successfully retained its full competitive position throughout the world.

Company News

The Australian Pastoral Research Trust is inquiring into various quarters as to the practicability of using wool instead of cotton in making cord tire fabric.

The Condor is a new dry cell, having a container finished in green and blue, which has been put on the market by the India Rubber Gutta-Percha and Telegraph Works, London.

Some time in July, Lothar Hock will come to London to read a paper on "The Importance of Intermolecular Forces in Relation to the Physical and Technical Properties of Rubber" before the Institution of the Rubber Industry.

The *India Rubber Journal* learns that the rubber paving block made by the North British Rubber Co., for the job at Victoria Street, Bristol, consists of a 9 by 4½ by 2-inch rubber cap mounted on a concrete block of slightly smaller dimensions all around. The rubber cap is 1-inch thick, of semi-hard rubber vulcanized to a tread of rubber compound also 1-inch thick. A chaplet of steel with extending lugs serves as an anchorage and connection to the concrete half of the block which is cast around it. The smaller dimensions of the concrete base allow ample space for the grouting to obtain firm hold on all four sides when the block is laid. The wearing surface of the cap is slightly higher in the middle, which not only prevents wear at the edges, but affords a good holding on the traffic.

W. F. V. Cox, secretary of the Institution of the Rubber Industry, Faraday House, 10 Charing Cross Road, London, W.C.2, recently won the Captain's Prize at a golf tournament at Sundridge Park by beating J. K. Hampton, 3 and 2.

DENMARK

A new company called Calpax has been established in Copenhagen to retread old tires. The concern, it is said, has 10 large, modern vulcanizing machines of French manufacture, and the process permits the entire new tread to be applied at one time, which gives a desirable uniformity. The new plant can handle about 100 casings a day.

GERMANY

Rubber Association Meeting

The fifth general meeting of the Deutsche Kautschuk Gesellschaft was scheduled to take place May 14, 15, 16, 1931, in Eisenach. The program included the reading of the following papers:

May 15, 1931: "The Place of German Rubber Industry in World Economics," W. Lindemann, Berlin. "Microporous Rubber," H. Beckmann, Berlin-Zehlendorf. "The Minimum of Sulphur Needed for Vulcanization and the Meaning of the Vulcanization Process," G. Bruni, Milan. "On the Polymorphism of the Gutta Percha Hydro Carbon," G. von Susich, Ludwigshafen. "Two Years in the Rubber Districts of British Malaya and Netherlands East Indies," Paul Scholz, Frankfurt a. M.

May 16, 1931: "Some Contributions to the Chemistry of Rubber," R. Pummerer, Erlangen. "An Example of the Scientific and Economical Production of Smoked Plantation Rubber," N. H. v. Harpen, The Hague, Holland. "Vulcanization with Benzoyl Peroxide," A. van Rossem and P. Dekker, Delft, Holland. "Recent Developments in the Field of Microscopy and Its Technical Application, Particularly in Connection with Rubber," E. A. Hauser, Frankfurt a. M.

Statistics—First Quarter 1931

German crude rubber imports for the first quarter of 1931 came to 123,686 quintals, value 11,081,000 marks, as compared with 129,933 quintals, value 20,976,000 marks, in 1920. Reexports were 14,301 quintals, value 1,439,000 marks, against 9,549 quintals, value 1,536,000 marks, the year before so that, if stocks are left out of account, the consumption for the period under review was 109,385 quintals, value 9,642,000 marks, as compared with 120,384 quintals, value 19,440,000 marks, for the corresponding period of the preceding year.

At the same time the exports of manufactured rubber goods from Germany totaled 45,134 quintals, value 21,742,000 marks, against 60,921 quintals, value 31,583,000 marks, in the first quarter of 1930. The imports of rubber goods also declined sharply and were 12,383 quintals, value 6,268,000 marks, against 27,093 quintals, value 13,735,000 marks.

Company News

The Pepege Deutsche Gummiwerke A. G., Marienburg, has raised its capital from 1,000,000 to 2,000,000 marks.

The Goodyear Tire & Rubber Co., A. G., Berlin, reports net profits of 87,000 marks and declares a dividend of 10 per cent against nil the previous year.

The Veritas Gummiwerke A. G., Berlin (formerly Vereinigte Berlin-Frankfurter Gummiwarenfabriken), distributes no dividend this time on its capital of 1,320,000 marks. Net profits came to only 54,846 marks against 106,271 marks for the preceding year when a 6 per cent dividend was declared.

The Deutsche Kabelwerke A. G., Berlin,

reduced its costs by 480,000 marks, but nevertheless booked a profit of only 289,000 marks as compared with 983,560 marks the year before. After setting aside 14,450 marks to reserve, the balance was carried forward. In the previous year a 6 per cent dividend had been distributed. There was a considerable outlay caused by the modernizing of the factory for insulated wire and cables which has been transferred to Ketschendorf. Of the firm's subsidiaries, The Deka Pneumatik G. m. b. H., reports a successful year, but the Julius Friedlander Gummiwarenfabrik G. m. b. H., could make no profits.

The Asbest-und Gummiwerke Alired Calmon A. G., Hamburg, was unable to pay a dividend for the past year. With a capital of 2,454,000 marks, the concern made a net profit of only 15,954.92 marks, which will be carried forward. While business during the first half of the year was satisfactory, the general depression absorbed the profits during the second half of the year.

Rubber Thread Association

The International Rubber Thread Association with headquarters at Cologne has just been formed and includes all the European rubber thread manufacturers—German, Italian, English, and Czechoslovakian—in addition to those American firms interested in selling in Europe. The purpose of the Association is to regulate prices and also to make uniform terms of payment and delivery. It is hoped that in this way the price war will finally be ended.

German Consultant

Dr. Waldemar Zieser, a leading German rubber chemist, Rich. Wagnerst, Munich, Germany, is a consultant to the trade in patent matters relating to rubber and gutta percha.

Dr. Zieser, a graduate of the University of Karlsruhe, was for sixteen years head of the rubber research department of the I. G. Farbenindustrie, Leverkusen, Germany, where he played a leading part in the development of synthetic rubber. His activities in this capacity brought him in close contact with the German Patent Office.

FRANCE

Comparing the figures for France's rubber trade during 1930 with those for 1929, it becomes apparent that while there has been a decrease in exports of almost all types of rubber goods, particularly of tires and footwear, there has been a marked increase in the importation of crude and manufactured rubber.

In 1930 the total consumption of crude rubber, gutta percha, and balata came to 820,326 quintals, against 723,694 in 1929. The total imports of rubber manufactures represented a value of 244,959,000 francs against the corrected figure for 1929 of 201,213,000 francs. That is to say, the 1930 imports of goods show an increase of nearly 22 per cent.

(Continued on page 98)

Rubber Industry in Far East

NETHERLANDS EAST INDIES

Rubber Committee's Plans

Dr. Bernard, Director of Agriculture, Industry, and Commerce, of the Netherlands East Indies before leaving for Europe on April 15 was interviewed by a correspondent of the *Telegraaf*, of Amsterdam, and expressed himself as follows regarding restriction plans:

"Some days ago I received the plans of the Rubber Committee. Only in regard to a few details did these show differences, hardly worth mentioning, from the original plan by Sir George Maxwell. The idea suggested by the latter, of levying a restriction on the native product if the market price rose above a previously determined limit, is also embodied in the plans.

"However the Netherlands Indies Government would not be able to cooperate in the introduction of such a measure. It cannot make special laws for a part of the population. That is impossible.

"In general it may be said that the Netherlands Indian Government cannot cooperate in a plan which is not sound in all its details and which is not in the general interest of all groups of the population and of the rubber industry. Should a plan be submitted including these characteristics, together with the possibility of promoting the interests of producers, then the government will most certainly take these proposals into consideration.

"As for the attitude of the dissentients: like all growers they naturally act solely from self-interest, a very unalloyed and healthy motive. And indeed all are actuated by this.

"Nevertheless it certainly is a pity that opinions among producers are so divergent.

"Naturally I shall consult with different men prominent in rubber circles while I am in Holland, and I hope that in this way the various currents will be led into a single channel. What the result of my discussions will be is, of course, something that cannot be foretold."

Commenting on this statement, the correspondent says that while Dr. Bernard may consider the attitude of those opposing rubber restriction very natural—and undoubtedly from their point of view they have ample cause for this attitude—many, in particular the British planters both in Malaya and the Dutch East Indies, are not at all satisfied with the actions of those who do not concur with the efforts of the Rubber Committee. Here the grievance is not so much that there should be opponents to the scheme, but that in the matter of trying to obtain restriction the Dutch Committee, proposing different plans every little while that for some reason or other have to be squashed, acts in a manner giving the impression that it is making sport of the British planters.

The recent abortive attempt of the Rubber Committee is a case in point. To be

sure, the committee announced later on that it would continue in its endeavors with unabated energy, but certainly British planters will attach much less importance to the authority of the committee than formerly, since a powerful section of the producers has already in advance shown itself adverse to restriction.

These views are of particular interest because of the fact that in April a new Association was established, known as the *Verubo-Vereeniging van Rubber Producenten ter Bepijking der Productie* (Association of Rubber Growers for the Restriction of Output) to which any rubber producing firms in the Dutch East Indies can belong, and it was optimistically declared that the meeting was a triumph for the founders as it had been shown that a considerable majority of producers including British are on the side of the new Association.

Dr. Bernard's Mission

With regard to Dr. Bernard's mission to Holland, the *Java Bode* learns on good authority that the aim of the Director of Agriculture will be to attempt to bring producers and consumers together with a view to saving the industry. Knowing Dr. Bernard's point of view, the paper suggests that his stand is that there is no longer any sense in restriction for the reason that striving for high prices will have the opposite result of that desired. The aim is stabilizing consumption and production, to which end it is necessary to effect an arrangement between the parties concerned whereby rubber will be delivered at a fixed price sufficient to allow a profit, however small, to the producer, while the consumer is assured of a steady supply of rubber at a price that is also agreeable to him.

Sumatra Areas and Outputs

How the Sumatra rubber industry is meeting the crisis is shown in the annual report on the situation in East Coast Sumatra, that is issued by the Commercial Association of Medan.

Because rubber prices have been exceedingly low and even the cheapest producers have been working at a loss, and it is recognized that the only way to recovery in the industry is in reducing costs by increasing outputs, a number of the biggest concerns decided to extend considerably their planted area during 1930. The new areas will be planted with the best materials and are expected in time to give very high outputs so that it is foreseen that those estates with no budded gardens will in the future have to meet extremely difficult conditions. The extensions of 1930 clearly indicate the fierceness of the struggle for existence now going on in the rubber industry.

The trend in planting in East Coast of Sumatra is illustrated by the following figures: Planted area at end of 1921, 162,000 hectares; 1926, 202,000 hectares; 1927, 221,000; 1928, 242,000; 1929, 255,000; 1930, 270,000.

The productive area has remained practically stationary, partly because at the time of the slump about seven years ago, but little expansion in planting took place and partly because tapping had been stopped in some areas.

The effect of the May tapping holiday last year is noted in the slightly decreased output as compared with 1929.

Below is a table showing the plantations according to ownership, as well as the planted and mature areas and the outputs for 1930.

	Planted Area Hec- tares	Pro- ductive Area Hec- tares	Out- put Metric Tons	Yield Per Hectare Kilo- grams
Dutch	102,188	56,674	23,873	421
British	76,117	53,865	18,359	341
American	44,358	29,554	17,801	604
Franco-Belgian	30,104	16,439	6,263	381
Others	17,626	12,913	4,868	377
Total	270,393	169,445	71,164	420

A comparison of 1929 and 1930 acreages indicates that the extensions in areas planted have been undertaken by Dutch and American concerns. The rapidly increasing output per hectare on American estates, which gives them a total output approaching that of the British estates in this section, although their mature area is less by nearly half, is deserving of attention. In 1924 the yield per hectare (hectare = 2.47 acres) on American estates averaged 364 kilos (kilo = 2.2 pounds); this yield increased to 574 kilos in 1929 and to 604 kilos in 1930.

Regarding restriction, the Association remarks that all attempts to arrive at forced restriction are doomed to failure, the more so if the price of stabilization is not fixed at a very low level, for in that case there would be extensions in the planted areas and native rubber would glut the market. There would only be sense in restriction if it were accompanied by the prohibition of new plantings, and that measure could hardly be put through.

Another indication of the change in East Coast of Sumatra is the reduction in the number of laborers, which is now about 70,000, as in 1916.

Estates Not Producing

Recent statistics regarding output of Dutch rubber estates showed 24 N. E. I. estates with a capacity of about 1,068 tons annually, which had definitely stopped tapping in December, 1930. In addition to these thirty estates, though not listed as having definitely closed down, produced no rubber in December, 1930. The total output capacity of these is 2,552 tons

annually. That is in December, 1930, there were 54 estates with annual capacity of 3,620 tons and a monthly capacity of over 300 tons, out of production.

By far the majority of these estates were located in Java, that is 19 with annual tonnage of 829 which stopped tapping and 25 with annual output of 2,281 tons, temporarily out of production, were in Java; while 4 with annual output of 84 tons stopped and 4 with annual output of 259 tons were temporarily out of production in Sumatra; and finally there was one estate having an output capacity of 155 tons that stopped tapping in Menado, and one with output of 12 tons per annum temporarily out of production in Amboina.

Tire Imports

Considering tire imports for 1928, 1929, and 1930, it appears that during the latter year imports had dropped to the lowest figure in three years. Thus in 1928 the number of tire casings imported was 256,656, value 6,747,943 guilders; in 1929, 307,401, value 9,389,457 guilders; and in 1930, 235,481, value 6,496,206 guilders. Imports from the United States represented about half the total value in 1930, that is 1,199,561 guilders, which, however, was a decline from 5,130,905 guilders in 1929. Japan came second with 880,578 against 951,910 guilders, displacing both Italy (814,374 against 1,164,297 guilders) and Germany (374,384 against 982,360 guilders) which had been second and third respectively the year before.

England in 1930 came third with an increase from 638,979 to 821,318 guilders; while France was last with 144,613 against 437,308 guilders. In the above figures it is worth noting that, while imports of these goods from all countries show considerable decreases, the only exception is England, which increased shipments by over 30 per cent.

Imports of tubes amounted to 196,871, value 897,087 guilders, against 263,453, value 1,283,610 guilders in 1929. The chief sources were United States (508,841 against 596,093 guilders) and Japan (161,081 against 305,424 guilders).

Shipments of solid tires to the N. E. I. also fell heavily; the total value in 1930 was 266,304 guilders against 552,361. More than half was supplied by the United States, whose share represented a value of 176,875 against 415,826 guilders.

Clone Yields

The Director of the Experiment Station for Rubber issues the outputs obtained from some Tjirandji and Planters-trots clones, for which the tapping year closes at the end of February. The tapping system was the same as that for other clones on the Tjirandji estate, that is 1/3 of the circumference every other day, with a bark consumption of 3 cm. per month. Tapping days totaled 180.

The clone Tjirandji XVI with 11 trees tapped showed an average output per tree per annum of 9.2 kilos, with monthly averages ranging from 26 and 24 grams dry rubber per tapping during August and September respectively, to 59 and 62 grams dry rubber per tapping during

MALAYA

Arter's Restriction Views

At the annual meeting of the Planters' Association of Malaya, held March 31, J. S. Arter, the chairman, in his review of the rubber situation, uttered the following warning:

"Wistful glances are still cast toward this horizon (restriction) and I should like you to beware of a mirage," and he continued by stating that planters must continue to keep down costs until the planters and the government are convinced that the cure lies entirely in their hands.

"We are hearing rumors that we are about to be approached with a view to combined control," he went on to say, "but in view of past experience I would not take an optimistic view of this report; and even should it prove correct, and we be asked to cooperate, I hope that the proposal will not be acceded to without very careful scrutiny, and unless attended by an absolutely safe guarantee of good faith.

"The position is difficult, but we are better off than our neighbors, and this factor should be used to our advantage with a keen recollection of the futility of obtaining permanent benefit from any restriction scheme which is not honestly supported by every interested party.

"I think that our Dutch neighbors are hardly likely to approach us with any acceptable proposal until the lesson has extended over a very protracted period, and that any undue impatience upon our part is liable to arouse the false hope that we can be prevailed upon to repeat the errors of the past."

The *Singapore Free Press* says that if the above opinion represents what planters in Malaya think at present, then enthusiasm for restriction is very lukewarm. "The fact seems to be," remarks the paper in question, "that the rubber industry has come to recognize that the slump has brought more benefits in informative experience in costs reduction than it has brought evils in reduced prices, or if that be putting it too high, it is recognized that the advantages of a restriction scheme may be bought very much too dearly.

"The very different view taken of costs and prices now as compared with a few years ago is well illustrated by Mr. Arter's statement at the meeting that four-penny rubber had not made the inroads into stocks which he had anticipated, and Mr. Rennie's remark in his speech at the Chamber of Commerce meeting, that a pivotal price of 5d. with 25 per cent of restriction would enable the normal estates to carry on."

The paper fully agrees that the lack of trust shown in any suggestions of Dutch

cooperation in the matter of restriction, in Mr. Arter's speech, is both natural and right. And it has the opinion of most planters here on its side when it continues:

"The Dutch interests adopted a policy of non-participation before, probably because they saw such a policy would be a very profitable one for them. They are not to be blamed for such a course of action, but, on the other hand, they cannot expect that any enthusiasm will be shown for their overtures now, when the advantages they formerly enjoyed having gone, they desire to cooperate, or profess a desire for cooperation."

Estates Out of Tapping

Reports current that this and that estate are closing down or are thinking of doing so, lead to an exaggerated notion of the decrease in the area taken out of tapping. Certainly if there are some estates who are actually drastically cutting down their tapping programs, there are a sufficient number of others who are tapping so intensively that their increased outputs more than balance any diminution caused by the abstinence of others. According to a London firm of brokers, returns from 281 estates show that many are increasing production, and in fact the total crops of these same estates actually showed an increase of 4.7 per cent in March over February outputs.

What the actual cessation of tapping amounts to on estates of over 100 acres in Malaya may be judged from the following data showing areas on these estates that were put out of tapping by the end of November, 1930:

	Area Acres	Usual Monthly Crop Tons
Perak	2,268	39
Selangor	5,239	57
Negeri-Sembilan	8,271	89
Pahang	1,639	17
Total F. M. S.	17,417	202
Malacca	1,233	11
Dindings .....	.....	..
P. Wellesley	1,803	14
Total S. S.	3,036	25

To the above areas should be added 8,711 acres in the Straits Settlements which had been placed out of tapping by the end of November on estates of 100 acres or over, which, while still tapping, had reduced the area tapped. The total area out of tapping at the end of 1930, therefore, must have been around 35,000 acres.

From the table above it appears that producers with lower yields have gone out of tapping first.

Planting Extensions in 1930

The Assistant Registrar General of Statistics, J. Gordon-Carrie, announces that new planting on Federated Malay States rubber estates of 100 acres or over during 1930 amounted to 10,125 acres, of which 2,800 were budgrafted from proven clones.

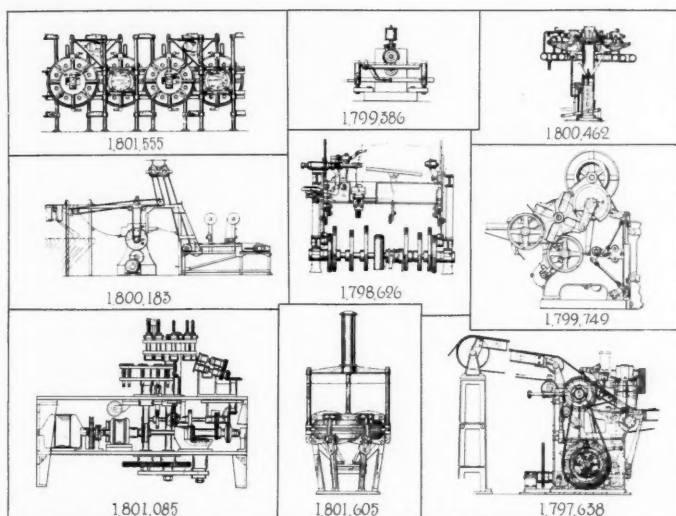
In the Straits Settlements the corresponding figures were: planted 1,155 acres, of which 255 acres were budgrafted from proven clones.

It seems that there are now about 115,000 acres of budgrafted rubber in Malaya, of which from 60 to 70 per cent were budded from recognized clones.

May, June, and July. A comparison of the outputs from this clone during 1928-29, 1929-30, and 1930-31 when the trees were respectively 8½, 9½, and 10½ years old, shows that the average annual output per tree fell from 10.9 to 10.8 and then to 9.2 kilos. The slight decline in output in 1929-30 may be due to the fact that the number of tapping days was 178 instead of 181 as in the preceding year and 180 as in the last year.

(Continued on page 98)

Patents, Trade Marks, Designs



Machinery

United States

1,797,638.* **Cutting Machine.** Tire tread slab rubber is cut automatically from a continuous web or slab of material into predetermined lengths. The machine is also rapidly adjustable to cut any desired length of material within prescribed limits. A. E. Collins and S. D. McLaughlin, Akron, O., assignors, by mesne assignments to Miller Rubber Co., Inc., Wilmington, Del.

1,798,626.* **Assembling Footwear Upers.** By this machine flat built boot-leg blanks can be wrapped about the boot tree either by motion of the material relative to the last, or both the material and the last. The boot-leg blank is applied under tension and secured in place by pressure. E. L. Patten, assignor to L. Candee & Co., both of New Haven, Conn.

1,799,386.* **Trimming Attachment.** This device is designed for trimming the overflow from molded rubber articles such as heels. The machine includes a pair of cooperating disk knives and a work supporting table on which the heels are moved about while being trimmed. H. B. Norcross, Brockton, Mass.

1,799,749.* **Trimming Machine.** This machine is designed for automatically feeding articles to be cut or trimmed to cutting position for trimming and finally delivering the trimmed article from the machine. P. R. Hoopes, Hartford, Conn., assignor to Essex Rubber Co., Trenton, N. J.

1,800,183.* **Assembling Machine.** An apparatus is provided by which bias cut pieces of fabric may be united into a continuous strip, a cushion strip applied to it, and the assembled stock be wound into a roll with interposed

liner. All of these operations are effected automatically and continuously. E. F. Maas and R. W. Snyder, assignors to Goodyear Tire & Rubber Co., all of Akron, O.

1,800,462.* **Tube Cementing Device.** By this device a coating of cement can be applied automatically to the ends of inner tubes for splicing. It is also adaptable for use with a conveyor, which carries the tubes past buffing, cementing, and drying stations, to the final splicing point. C. E. Maynard, Northampton, assignor to Fisk Rubber Co., Chicopee Falls, both in Mass.

1,801,085.* **Tennis Ball Machine.** This is designed for preparing hemispherical ball parts molded with bevel edges for union into completed balls. The fin developed along the outer edge of the hemispherical shell is removed and its bevel edges buffed ready to join the halves into a hollow ball. W. E. Humphrey, assignor to Pennsylvania Rubber Co., both of Jeanette, Pa.

1,801,555.* **Fluid Lock.** This device provides a split tire tube mold or group of such molds so arranged that it becomes unnecessary to cool each mold before removing the cured tire or reheat it for the next cure. Continuous production can thus be maintained. The locking feature comprises a readily disengageable fluid actuated means for clamping the mold halves together during the vulcanizing operation. E. Hutchens, Milwaukee, assignor to Utility Mfg. Co., Cudahy, both in Wis.

1,801,605.* **Fluid Lock for Vulcanizers.** In this lock for individual vulcanizers the locking pressure is imposed on the mold inside the perimeter of the outer joint in order that this pressure will not have a rocking effect with the joint as a fulcrum. Thus any mold distortion is avoided that would cause the inner joint to open up with loss of pressure and escape of rubber

from the mold. J. C. Jennejohn, assignor to Utility Mfg. Co., both in Cudahy, Wis.

18,050 (Reissue). **Tire Handling Machine.** De W. T. Blackmon, Columbia, S. C.

1,797,248. **Filtering Apparatus.** A. Szegvari and C. M. Spencer, assignors, by mesne assignments, to American Anode, Inc., all of Akron, O.

1,797,249. **Cord Making Machine.** R. Truesdale, R. C. Smith, and E. Simpson, all of Erdington, Birmingham, assignors to Dunlop Rubber Co., Ltd., Fort Dunlop, both in England.

1,797,389. **Tire Measuring Device.** H. J. Woock, assignor to Super Mold Corp., both of Lodi, Calif.

1,797,568. **Blank Forming Device.** F. R. Dean, assignor to Goodyear's India Rubber Glove Mfg. Co., both of Naugatuck, Conn.

1,797,580. **Tube Machine.** E. Hopkinson, New York, and W. A. Gibbons, Little Neck, both in N. Y., assignors to Morgan & Wright, Detroit, Mich.

1,797,734. **Tensile Testing Machine.** A. Schopper, assignor to the Firm Louis Schopper, both of Leipzig, Germany.

1,797,860. **Tire Spreader.** J. Giet, Long Island City, N. Y.

1,798,210. **Tire Casing Vulcanizer.** L. A. Laursen, assignor of one-fourth to P. F. Laursen, both of Akron, O.

1,798,322. **Golf Ball Washer.** C. Floyd, Pasadena, and P. L. Bradford, La Canada, both in Calif.

1,798,538. **Weighing Device.** E. Karrer, Cleveland Heights, O., assignor to B. F. Goodrich Co., New York, N. Y.

1,798,624. **Tube Tester.** P. L. O'Brien, Lowell, Mass.

1,798,806. **Calender Knife Mounting.** F. B. Pfeiffer, Akron, assignor to Seiberling Rubber Co., Barberton, both in O.

1,798,826. **Tire Vulcanizer.** P. Wiegardt, Magdeburg, assignor to the Firm Fried. Krupp Grusonwerk Aktiengesellschaft, Magdeburg-Buckau, both in Germany.

1,799,124. **Tire Core.** I. K. Rystedt, assignor to National Tirecord Co., both of Dayton, O.

1,799,332. **Article Polishing Device.** W. C. Stevens, assignor to Firestone Tire & Rubber Co., both of Akron, O.

1,799,375. **Drying Chamber Sealing Device.** R. R. Jones, assignor to Firestone Tire & Rubber Co., both of Akron, O.

1,799,620. **Bias Cutter Fabric Guide.** E. D. Putt, assignor to Firestone Tire & Rubber Co., both of Akron, O.

1,800,180. **Cooling Tubing Machine.** R. B. Day, assignor to Goodyear Tire & Rubber Co., both of Akron, O.

1,800,182. **Gum Strip Removing Device.** R. S. Kirk, assignor to Goodyear Tire & Rubber Co., both of Akron, O.

1,800,192. **Strip Assembling Machine.** E. F. Maas and R. W. Snyder, assignors to Goodyear Tire & Rubber Co., all of Akron, O.

1,800,332. **Blank Former and Manipulator.** H. L. Young, Akron, O., as-

* Pictured in group illustration.

signor to B. F. Goodrich Co., New York, N. Y.

- 1,801,025. **Masticating and Dispersing Blade.** E. Schmierer, assignor to Baker Perkins Co., Inc., both of Saginaw, Mich.
- 1,801,335. **Airbag.** H. A. Denmire, assignor to General Tire & Rubber Co., both of Akron, O.
- 1,801,613. **Molding Press.** W. Ratzer, Oak Park, assignor to Belden Mfg. Co., Chicago, both in Ill.
- 1,801,757. **Slitting Machine.** C. A. Shipping, Kitchener, Ont., Canada, assignor to L. Candee & Co., New Haven, Conn.
- 1,801,759. **Tire Casing Machine.** W. J. Steinle, deceased, by W. Steinle, administrator, both of Flushing, N. Y., assignor to Hartford Rubber Works Co., Hartford, Conn.
- 1,801,954. **Tire Patch Applier.** C. E. Dunlap, Sioux City, Iowa.
- 1,802,119. **Breaking Down Rubber Stock.** C. E. Maynard, Northampton, assignor to Fisk Rubber Co., Chicopee Falls, both in Mass.
- 1,802,120. **Inner Tube Machine.** C. E. Maynard, Northampton, assignor to Fisk Rubber Co., Chicopee Falls, both in Mass.
- 1,802,287. **Vulcanizer.** L. J. Stambois, deceased, by D. and R. Stambois, administrators, and A. A. Stamboise, all of London, England.

Dominion of Canada

- 310,408. **Stitcher Testing Device.** Goodyear Tire & Rubber Co., assignee of E. F. Maas, both of Akron, O., U. S. A.
- 310,409. **Vulcanizing Apparatus.** Goodyear Tire & Rubber Co., assignee of H. H. Chassagne, both of Akron, O., U. S. A.
- 310,616. **Vulcanizing Mold.** Bakelite Corp., New York, N. Y., assignee of G. W. Crosby, Woodcliff, N. J., both in the U. S. A.
- 310,716. **Recorder Controller.** Charles J. Tagliabue Mfg. Co., Brooklyn, assignee of F. J. Bast, Queens Village, both in N. Y., U. S. A.

United Kingdom

- 341,859. **Collapsible Core.** Dunlop Rubber Co., Ltd., London, and T. Norcross, Fort Dunlop, Birmingham.
- 342,012. **Fabric Coating Device.** Gummiwerke Fula Akt-Ges., Fulda, Germany.
- 342,382. **Physical Testing Machine.** Dunlop Rubber Co., Ltd., London, E. Simpson, and R. Truesdale, both of Fort Dunlop, Birmingham.
- 342,408. **Vulcanizer.** C. Macbeth, Birmingham.
- 343,233. **Tire Vulcanizing Mold.** Rogers Wilson & Co., Ltd., and W. A. Rogers, both of Birmingham.
- 343,434. **Article Delivering Device.** Soc. Italiana Pirelli and U. Pestalozza, both of Milan, Italy.

Germany

- 522,308. **Water Bottle Mold.** Dr. Leonhardt & Reichelt G.m.b.H., Hamburg, 11.
- 522,541. **Tire Chafing Strip Machine.** Goodyear Tire & Rubber Co., Akron, O., U. S. A. Represented by R. H. Korn, Berlin S.W.11.
- 524,254. **Rubber Mixing Apparatus.**

M. Muller Maschinen-und Formenfabrik, Hannover-Hainholz.

Designs

- 1,162,886. **Screw Spindle for Belt Blocks.** Franz Clouth Rheinische Gummiwarenfabrik A.G., Köln-Nippes, and Isbeg Industrie & Schiffsbedarf G.m.b.H., Berlin W. 9.
- 1,165,261. **Floor Tiling Cutter.** G. Strudthoff, Delmenhorst i. Oldbg.
- 1,166,001. **Pressure Gage.** Continental Gummiwerke A.G., Hannover.

Process

United States

- 1,797,240. **Inner Tube.** E. B. Newton, assignor to American Anode, Inc., both of Akron, O.
- 1,797,250. **Transparent Vulcanized Rubber.** D. F. Twiss and E. A. Murphy, assignors to Dunlop Rubber Co., Ltd., all of Birmingham, England.
- 1,798,305. **Means for Preventing Electrolytic Action.** H. Christophersen, E. Orange, N. J., assignor to Revere Rubber Co., Chelsea, Mass.
- 1,798,355. **Heel Member.** C. Roberts, Winchester, Mass., assignor, by mesne assignments, to United Shoe Machinery Corp., Paterson, N. J.
- 1,798,798. **Hose.** C. W. Leguillon, Akron, O., assignor to B. F. Goodrich Co., New York, N. Y.
- 1,799,217. **Emulsified Rubber Paper.** J. A. De Cew, assignor to Process Engineers, Inc., both of New York, N. Y.
- 1,801,666. **Gas Impervious Sheet Material.** W. C. Geer, Akron, O., assignor to B. F. Goodrich Co., New York, N. Y.
- 1,801,667. **Bonding Rubber to Metal.** H. Gray, Akron, O., assignor to B. F. Goodrich Co., New York, N. Y.
- 1,801,771. **Footwear.** G. F. Gourley, Baldwin, N. Y., assignor to Goodyear's India Rubber Glove Mfg. Co., Naugatuck, Conn.
- 1,802,088. **Tire Construction.** T. Midgley, Hampden, assignor to Fisk Rubber Co., Chicopee Falls, both in Mass.

Dominion of Canada

- 309,899. **Recovery of Waste Rubber.** Dispersions Process, Inc., Dover, Del., assignee of J. K. Mitchell, Villa Nova, Pa., both in the U. S. A.
- 310,147. **Rubberizing Fabrics.** Dunlop Rubber Co., Ltd., London, N. W. 1, assignee of G. W. Trowbridge, Birmingham, both in England.
- 310,182. **Tire Cord Manufacture.** Manville-Jenckes Co., Pawtucket, assignee of K. B. Cook, Providence, and L. P. Gervais, Pawtucket, all in R. I., U. S. A.
- 310,252. **Fabric Making Process.** C. Dreyfus, New York, N. Y., assignee of G. Schneider, Montclair, N. J., both in the U. S. A.
- 310,282. **Attaching Soles to Leather.** O. Brockman, Louisville, Ky., U. S. A.
- 310,392. **Producing Rubber Articles.** Dominion Rubber Co., Ltd., Montreal, P. Q., assignee of M. C. Teague, Jackson Heights, N. Y., U. S. A.
- 310,537. **Pressing Up Footwear.** H. C. L. Dunker, Helsingborg, Sweden.
- 310,713. **Footwear Manufacture.** Speweld Shoe Inventions, Ltd., assignee

of A. P. Robinson, both of Northampton, England.

United Kingdom

- 341,542. **Waterproof Paper and Board.** Richardson Co., Lockland, O., U. S. A.
- 342,496. **Tire Cord Manufacture.** Manville-Jenckes Co., Pawtucket, assignee of K. B. Cook, Providence, and L. P. Gervais, Pawtucket, both in R. I., U. S. A.
- 343,315. **Aqueous Rubber Dispersions.** Goodyear Tire & Rubber Co., Akron, assignee of C. R. Park, Cuyahoga Falls, both in O., U. S. A.

Germany

- 523,946. **Coating Dental Rubber.** M. Ow-Eschingen, Vienna, Austria. Represented by F. Meffert and L. Sell, both of Berlin, S.W. 68.

Chemical

United States

- 1,797,241. **Age Resister.** M. C. Reed, Akron, O., assignor to B. F. Goodrich Co., New York, N. Y.
- 1,797,243. **Rubber Dispersion.** W. L. Semon, Cuyahoga Falls, and R. A. Crawford, Akron, both in O., assignors to B. F. Goodrich Co., New York, N. Y.
- 1,798,133. **Sunproofers.** S. M. Cadwell, Leonia, and L. Meuser, Bergenfield, both in N. J., assignors to Naugatuck Chemical Co., Naugatuck, Conn.
- 1,798,159. **Accelerator.** R. V. Heuser, Elizabeth, N. J., assignor to American Cyanamid Co., New York, N. Y.
- 1,798,253. **Compounding Soap Process.** W. A. Gibbons, Little Neck, N. Y., assignor to American Rubber Co., E. Cambridge, Mass.
- 1,800,435. **Antioxidant.** L. J. Christmann, Jersey City, N. J., assignor to American Cyanamid Co., New York, N. Y.
- 1,800,561. **Composition.** S. A. Neidich, Edgewater Park, assignor to Neidich Process Co., Burlington, both in N. J.
- 1,801,621. **Aqueous Dispersions.** A. Biddle, Trenton, N. J., assignor to United Products Corp. of America, a corporation of Del.
- 1,801,754. **Latex Preserver.** A. A. Nikitin, Passaic, N. J., assignor to Naugatuck Chemical Co., Naugatuck, Conn.
- 1,801,764 and 1,801,765. **Accelerators.** S. M. Cadwell, Leonia, N. J., assignor to Naugatuck Chemical Co., Naugatuck, Conn.
- 1,802,127. **Rubberizing Composition.** M. C. Teague, Jackson Heights, assignor to General Rubber Co., New York, both in N. Y.

Dominion of Canada

- 309,900. **Rubber Adhesive.** Dominion Rubber Co., Ltd., Montreal, P. Q., assignee of W. W. Dunfield, Yonkers, N. Y., U. S. A.
- 309,902. **Styrol Process.** Dominion Rubber Co., Ltd., Montreal, P. Q., assignee of O. H. Smith, W. Englewood, N. J., U. S. A.
- 310,144. **Age Resister.** Dominion Rubber Co., Ltd., Montreal, P. Q., assignee of C. Coleman, Passaic, N. J., U. S. A.

- 310,145. **Age Resister.** Dominion Rubber Co., Ltd., Montreal, P. Q., assignee of S. M. Cadwell, Leonia, and S. I. Strickhouser, Passaic, both in N. J., U. S. A.
- 310,617. **Cement.** Bakelite Corp., New York, N. Y., assignee of M. E. Delaney, Bloomfield, N. J., both in the U. S. A.

United Kingdom

- 341,447. **Coated Fabrics.** H. A. Brunsen, Philadelphia, Pa., U. S. A., and Chemische Fabriken K. Albert Ges., Amöneburg, Wiesbaden-on-Rhine, Germany.
- 342,107. **Synthetic Rubber.** I. G. Farbenindustrie A. G., Frankfurt a. M., Germany.
- 342,144. **Adhesive Composition.** British Celanese, Ltd., London.
- 342,194. **Treating Latex.** Dunlop Rubber Co., Ltd., London, and Anode Rubber Co., Ltd., St. Peter's Port, Guernsey, assignees of A. Szegvari, Akron, O., U. S. A.
- 342,314. **Synthetic Rubber.** A. Carpmacel, London. (I. G. Farbenindustrie A. G., Frankfurt a. M., Germany.)
- 342,330. **Accelerator.** Goodyear Tire & Rubber Co., assignee of J. Teppema, both of Akron, O., U. S. A.
- 342,396. **Sealing Compound.** A. C. Smith, Birmingham.
- 342,469. **Latex.** K.D.P., Ltd., Finsbury House, London.
- 342,485. **Latex Coagulant.** Goodyear Tire & Rubber Co., Akron, assignee of A. J. Gracia, Cuyahoga Falls, both in O., U. S. A.
- 342,502. **Age Resister.** Naugatuck Chemical Co., Naugatuck, Conn., assignee of S. M. Cadwell and S. I. Strickhouser, both of Passaic, N. J., all in the U. S. A.
- 342,634. **Age Resister.** Naugatuck Chemical Co., Naugatuck, Conn., assignee of L. H. Howland, Passaic, N. J., both in the U. S. A.
- 343,013. **Accelerator.** Goodyear Tire & Rubber Co., assignee of J. Teppema, both of Akron, and L. B. Sebrill, Cuyahoga Falls, all in O., U. S. A.
- 343,099. **Factice.** Imperial Chemical Industries, Ltd., London, and H. M. Bunbury, Crumpsall Vale Chemical Works, Manchester.
- 343,510. **Gutta Percha.** W. S. Smith, Newton Poppleford, Devon, H. J. Garnett, Sevenoaks, and J. N. Dean, Orpington, both in Kent.
- 343,531. **Rubber Attachment.** Dunlop Rubber Co., Ltd., London, D. F. Twiss, A. A. Round, and E. A. Murphy, all of Fort Dunlop, Birmingham.
- 343,532. **Rubber Articles.** Dunlop Rubber Co., Ltd., London, E. A. Murphy, R. G. James, and D. F. Twiss, all of Fort Dunlop, Birmingham.
- 343,533. **Factice.** Imperial Chemical Industries, Ltd., London, H. M. Bunbury and R. B. F. Clarke, both of Crumpsall Vale Chemical Works, Manchester.
- 343,548. **Latex Composition.** T. M. Rigby, Tarporley, Cheshire.
- 343,567. **Electric Insulation.** Electrical Research Products, Inc., New York, N. Y., assignee of F. S. Malm, Chicago, Ill., both in the U. S. A.

Germany

- 522,091. **Rubber Mass.** P. Hoyer, Merseburg-S., and H. Hoyer, Hagen i. W.
- 523,210. **Making Factice.** J. Baer, Basle, Switzerland. Represented by G. Winterfeld, Berlin S.W. 48.

General

United States

- 1,797,223. **Shaft Bearing.** B. B. Annis, Akron, O., assignor to B. F. Goodrich Co., New York, N. Y.
- 1,797,339. **Cow Teat Canule.** J. Gudmand-Hoyer, Nybolle, Denmark.
- 1,797,383. **Valve Stem Coupling.** J. Wahl and O. Melzer, both of New York, assignors to A. Schrader's Son, Inc., Brooklyn, both in N. Y.
- 1,797,425. **Fountain Pen.** C. E. Klaus, Wilkinsburg, Pa.
- 1,797,433. **Nursing Bottle and Nipple.** M. McCrea, Newburg Heights, O.
- 1,797,518. **Storage Battery Container.** H. L. Boyer, assignor to Joseph Stokes Rubber Co., both of Trenton, N. J.
- 1,797,538. **Tire.** G. H. Young, St. Paul, Minn.
- 1,797,630. **Air-Brake Hose Coupling.** G. D. Young, Firth, Neb.
- 1,797,693. **Elastic Fabric.** O. F. Neidel, assignor to George C. Moore Co., both of Westerly, R. I.
- 1,797,781. **Pump Piston.** F. E. McCaughey, Los Angeles, Calif.
- 1,797,840. **Power Transmitting Device.** G. H. Schieferstein, Berlin-Charlottenburg, Germany.
- 1,798,024. **Bathing Cap.** D. McBride, New Orleans, La.
- 1,798,046. **Self-Filling Sac Pen.** G. Sweetser, assignor to Mentmore Mfg. Co., Ltd., both of London, England.
- 1,798,177. **Numbering Machine.** C. Spielman, Richmond Hill, assignor to Wm. A. Force & Co., Inc., New York, both in N. Y.
- 1,798,467. **Pavement Marker.** M. E. Hartzler, Downers Grove, and E. P. Romilly, Chicago, both in Ill.
- 1,798,468. **Anchoring Device.** M. E. Hartzler, Downers Grove, and E. P. Romilly, Chicago, both in Ill.
- 1,798,484. **Tire Protective Casing.** F. Mott, Portland, Ore.
- 1,798,749. **Seal.** T. E. Murray, Brooklyn, N. Y.; J. B. T. E., Jr., and J. F. Murray, executors of said T. E. Murray, deceased, assignors to Metropolitan Device Corp., a corporation of N. Y.
- 1,798,773. **Battery Box and Handle.** H. Wydom, S. Boston, Mass., assignor, by mesne assignments to Hood Rubber Co., Inc., Wilmington, Del.
- 1,798,847. **Loom Temple Roll.** A. Lagasse, Fall River, Mass.
- 1,799,023. **Membrane Decanting Siphon.** O. Peters, Chemnitz, Germany.
- 1,799,065. **Bumper.** P. R. Rohm, assignor of two-fifths to B. Rohm, both of Vanderbilt, Pa.
- 1,799,147. **Catamenial Sack.** I. F. Brisache, New York, N. Y.
- 1,799,213. **Fountain Pen.** R. S. Carter, Hewlett, N. Y.
- 1,799,616. **Mat from Worn-out Tires.** J. B. Kiefer, Seattle, Wash.
- 1,799,630. **Frictional Vibration Damper.** P. E. Matthews, Plainfield, N. J., assignor to International Motor Co., New York, N. Y.
- 1,799,717. **Garment Hanger Clip.** S. A. Wilson, Spokane, Wash.
- 1,799,904. **Cushion Strip.** C. W. Howlett and R. Mitchell, both of Kokomo, Ind.
- 1,799,933. **Fluid Pressure Core.** F. J. Snyder, Springfield, assignor to Fisk Rubber Co., Chicopee Falls, both in Mass.
- 1,800,069. **Toy Cannon.** P. J. Hemmer, New York, N. Y., and H. Wanek, N. Bergen, N. J.
- 1,800,085. **Pipe Coupling.** E. J. Kroeger and J. R. Gammeter, both of Akron, O., said Kroeger assignor to said Gammeter.
- 1,800,138 and 1,800,139. **Syringe Hydrometer.** L. Edelmann, assignor to E. Edelmann & Co., both of Chicago, Ill.
- 1,800,143. **Envelope Sealing Medium.** J. C. Hughes, New York, N. Y.
- 1,800,178. **Flexible Connection.** J. F. Cooper and H. D. Cameron, assignors to Goodyear Tire & Rubber Co., all of Akron, O.
- 1,800,179. **Reinforced Web.** B. Darrow, assignor to Goodyear Tire & Rubber Co., both of Akron, O.
- 1,800,184. **Brake.** A. J. Musselman, assignor to Goodyear Tire & Rubber Co., both of Akron, O.
- 1,800,218. **Vacuum Cup Device.** J. Janda, Ridgewood, N. Y.
- 1,800,255. **Refrigerating Apparatus.** H. B. Hull, Dayton, O., assignor, by mesne assignments, to Frigidaire Corp., a corporation of Del.
- 1,800,269. **Syringe.** P. B. Vallé, assignor to Marvel Co., both of New Haven, Conn.
- 1,800,342. **Printing Roller Engraving.** J. Dyer, Long Beach, N. Y.
- 1,800,355. **Spring Cushion Joint.** H. S. Powell, Utica, N. Y.
- 1,800,405 and 1,800,406. **Footwear.** H. deB. Rice, assignor to National India Rubber Co., both of Bristol, R. I.
- 1,800,434. **Resilient Engine Mount.** L. P. Christman, assignor to Inland Mfg. Co., both of Dayton, O.
- 1,800,590. **Detachable Heel.** R. Bello, Trenton, N. J.
- 1,800,599. **Bicycle Tire Tag.** C. B. Cain, Lake, Wis., assignor to Fisk Rubber Co., Chicopee Falls, Mass.
- 1,800,811. **Safety Hand Ball.** E. K. Wolfe, New York, N. Y.
- 1,800,930. **Ventilated Shoe Sole.** W. Crick, Northampton, assignor to Frevva, Ltd., London, both in England.
- 1,800,956. **Toy Railway Roadbed.** O. R. Peterson, Jr., Pelham Manor, N. Y.
- 1,800,960. **Bathing Suit.** P. A. Savard, St. Ambroise, P. Q., Canada.
- 1,800,992. **Elastic Fabric.** W. J. Fox, assignor to James R. Kendrick Co., Inc., both of Philadelphia, Pa.
- 1,801,003. **Eraser.** W. Hines, Washington, D. C.
- 1,801,267. **Inflatable Hollow Article.** I. and L. Dorogi, Budapest, assignors of one half to Dr. Dorogi es Társa Gummigyar R. T., Budapest-Albertfalva, both in Hungary.
- 1,801,283. **Steering Wheel Rim.** F. C. McManus, Brooklyn, assignor to In-

- ternational Motor Co., New York, both in N. Y.
- 1,801,336. **Buffing Roll.** R. E. Duplessis, Beverly, Mass., assignor to United Shoe Machinery Corp., Paterson, N. J.
- 1,801,354. **Typewriting Machine.** J. Lindburg, Brooklyn, assignor to Underwood Elliott Fisher Co., New York, both in N. Y.
- 1,801,396. **Typewriting Machine.** L. A. Thatcher, Belleville, N. J., assignor to Underwood Elliott Fisher Co., New York, N. Y.
- 1,801,551. **Vehicle Steering Mechanism.** H. D. Geyer, assignor to Inland Mfg. Co., both of Dayton, O.
- 1,801,635. **Fountain Pen.** W. E. Moore, assignor to Parker Pen Co., both of Janesville, Wis.
- 1,801,716. **Tire Inflator.** J. F. Bowers, Georgetown, Del.
- 1,801,915. **Toothbrush.** J. E. Gray, Lynbrook, N. Y.
- 1,802,159. **Vehicle Flag Holder.** F. J. Schrank, Akron, O.
- 1,802,176 and 1,802,177. **Gasket.** W. W. Knight, Evanston, assignor to Roth Rubber Co., Chicago, both in Ill.

Dominion of Canada

- 309,798. **Mucilage Bottle Cap.** J. H. Francis, Winnipeg, Man.
- 309,799. **Safety Blasting Fuse.** J. Fritzsche, Wiener, Neustadt, Austria.
- 309,813. **Tire, Rim, and Wheel.** E. B. Killen, London, E. C. 4, England.
- 309,901. **Tufted Sheet Fibrous Material.** Dominion Rubber Co., Ltd., Montreal, P. Q., assignee of B. H. Foster, Maplewood, N. J., and K. B. Cook, Providence, R. I., both in the U. S. A.
- 309,908 and 309,909. **Flexible Mat.** Durable Mat Co., Seattle, assignee of H. W. Hollenbeck, Kirkland, both in Wash., U. S. A.
- 309,938. **Self-Filling Sac Pen.** Mentmore Mfg. Co., Ltd., London, E.9, assignee of G. Sweetser, London, S.E.19, both in England.
- 310,007. **Tag Supporter.** N. L. Adam, Sudbury, Ont.
- 310,054. **Clothes Hanger.** P. Picard, Neuilly-sur-Seine, Seine, France.
- 310,268. **Windshield Wiper.** C. A. Gooley and E. L. Gooley, Jr., co-inventors, both of Harrington, Wash., U. S. A.
- 310,283. **Capsuling Machine.** O. J. Bruun, Frederiksberg, Denmark.
- 310,296. **Vehicle Bogie Truck.** R. T. Glascodine, London, S.W.1, England.
- 310,331. **Spring.** A. Spencer, London, S.W.1, England.
- 310,386. **Electric Snap Switch.** Cutler-Hammer, Inc., assignee of R. A. Millermaster, both of Milwaukee, Wis., U. S. A.
- 310,484. **Saucer.** C. and B. Colombani and L. Chapt, assignee of one-third of the interest, all of Paris, France.
- 310,553. **Headlight.** J. D. Hudson, Montreal, P. Q.
- 310,601. **Electrical Insulation.** W. B. Wiegand, Sound Beach, Conn., U. S. A.
- 310,667. **Concrete Pipe Joint.** Hume Pipe Co. (South Africa), Ltd., assignee of A. G. Tainton, both of Germiston, Transvaal, South Africa.
- 310,669. **Wheel Torque Insulator.** International Motor Co., assignee of A. H. Leipert, both of New York, N. Y., U. S. A.
- 310,728. **Ball.** J. W. Clarke and H. K. Wagner, assignee of half the interest, both of St. Louis, Mo., U. S. A.

United Kingdom

- 341,268. **Gramophone Pickup.** Gramophone Co., Ltd., Middlesex, and B. Jackson, Kent.
- 341,572. **Artificial Leather.** R. Pickles, Clayton, and J. Pickles, Fence.
- 341,582. **Colotomy Appliance.** B. Maris (representative of H. C. Maris), Yorkshire.
- 341,920. **Brake.** Dunlop Rubber Co., Ltd., London, and F. Fellowes, Fort Dunlop, Birmingham.
- 341,966. **Stuffing Box Substitutes.** G. B. Vroom, Washington, D. C., U. S. A.
- 342,100. **Gramophone Needle Sharpener.** A. F. J. Wright, London.
- 342,105. **Spinning Spindle Supporter.** Siemens-Schuckwertwerke Akt.-Ges., Berlin, Germany.
- 342,145. **Molded Stopper.** F. W. Hampshire and F. W. Hampshire & Co., both of Derby.
- 342,207. **Gum Massager.** J. R. Mitchener, C. A. Bryant, and S. Casani, all of London.
- 342,332. **Medical Injection Container.** R. B. Waite, Springville, N. Y., U. S. A.
- 342,419. **Medical Electrode.** S. Offenbacher, Munich, Germany.
- 342,504. **Ash Tray.** E. A. Bellow, St. Leonards-on-Sea.
- 342,635. **Gramophone Pickup.** Vega Mfg. Corp., Wilmington, Del., assignee of S. Ruben, New York, N. Y., both in the U. S. A.
- 342,645. **Gramophone Pickup.** Naamloze Vennootschap Philip's Gloeilampenfabrieken, Eindhoven, Holland.
- 342,675. **Tire.** Hibbert Pneumatic Cell Tyre Co., Ltd., Goulburn, N. S. W., Australia.
- 342,784. **Closet Seat Guard.** W. C. H. P. and F. A. Hedgecock, both of Sussex.
- 342,851. **Door Draught Excluder.** W. West and F. Goodson, both of Sheerness, Kent.
- 342,901. **Horseshoe.** J. E. Pollak, London. (Imperator Hesteko Aktieselskabet, Tonsberg, Norway.)
- 342,944. **Scalp Massager.** C. C. Crouch, Hillsdale, G. P. Renkes, J. T. Burke, and G. E. Wedin, all of Rice Lake, both in Wis., U. S. A.
- 343,185. **Motor Vehicle Suspension.** Manning & Co., Chicago, Ill., U. S. A.
- 343,383. **Window Holder.** F. J. Stuart, Berkshire.

Germany

- 522,437. **Link Block Belt.** W. Kniehahn, Dresden-A.
- 523,159. **Fabric Block Belt.** Continental Gummiwerke A.G., Hannover.
- 523,481. **Flexible Belt Connection.** Continental Gummiwerke A.G., Hannover.
- 523,879. **Overshoe with Mud Guard.** Mishawaka Rubber & Woolen Mfg. Co., Mishawaka, Ind., U. S. A. Represented by H. Neubart, Berlin, S.W. 61.

- 524,045. **Fabric Block Belt.** J. Meyer, Köln.
- 524,046. **Fabric Belt.** J. Meyer, Köln.

Designs

- 1,162,249. **Brush.** Schwieders Guttapercha-und Gummiwaren G.m.b.H., Dresden-A1.
- 1,162,318. **Nonskid Horse Shoe.** A. G. Metzeler & Co., Munich.
- 1,162,493. **Floor Covering.** Gummiwerke Fulda A.G., Fulda.
- 1,162,510. **Protective Sheet.** Firma B. Braun, Melsungen.
- 1,162,871. **Exhaust Valve.** Dunlop Rubber Co., Ltd., London, England. Represented by B. Kaiser and E. Salzer, both of Frankfurt a. M.
- 1,162,885. **Multiple Block Belt Drive.** F. Clouth Rheinische Gummiwarenfabrik A.G., Köln-Nippes, and Isberg Industrie-und Schiffsbedarf G.m.b.H., Berlin W. 9.
- 1,162,980. **Shoe.** Harburger Gummiwarenfabrik Phoenix A.G., Harburg-Wilhelmsburg.
- 1,163,122. **Connecting Rod Spring.** Continental Gummiwerke A.G., Hannover.
- 1,163,195. **Apron.** Firma M. Steinberg, Köln-Braunsfeld.
- 1,163,240. **Pouch Shaped Covering.** Harburger Gummiwarenfabrik Phoenix A.G., Harburg-Wilhelmsburg.
- 1,163,287. **Hose.** C. Vollrath & Sohn, K.G., Bad Blankenburg, Thür. Wald.
- 1,163,389. **Bathing Shoe.** Firma M. Steinberg, Köln-Braunsfeld.
- 1,163,647. **Sponge Rubber Covered Flask.** Ungarische Gummiwarenfabriks A.G., Budapest, Hungary. Represented by J. Reitsstötter, Berlin.
- 1,163,704. **Finger Protector.** A. Pfreundt Krakow i. Mecklbg.
- 1,163,871. **Belt.** H. Kehrenberg, Wuppertal-Barmen.
- 1,163,922. **Knee Cushion.** Continental Gummiwerke A.G., Hannover.
- 1,164,334 and 1,164,335. **Nonskid Tire.** Continental Gummiwerke A.G. Hannover.
- 1,164,506. **Blood Pressure Apparatus.** R. Kallmeyer & Co., Berlin N. 24.
- 1,164,563. **Rubber Chocolate Tablet.** W. Erfurth, Altona-Stellingen.
- 1,164,720. **Friction Block.** Continental Gummiwerke A.G., Hannover.
- 1,164,999. **Scrubber.** R. Pinkert and B. Uebel, both of Berlin.
- 1,165,026. **Sponge Rubber Scrubber.** H. Haase, Dresden-N.
- 1,165,246. **Automobile Door Stop.** Franz Clouth Rheinische Gummiwarenfabrik A.G., Köln-Nippes.
- 1,165,544. **Bucket Protection.** R. Brabender, Wuppertal-Elberfeld.
- 1,165,805. **Colored, Striped Conductor.** Blodner & Vierschrodt, Gummiwarenfabrik & Hanfschlauchweberei A.G., Gotha.
- 1,165,862. **Sole.** Pigge & Marquardt A.G., Hameln.
- 1,165,941. **Water Sack.** Munden-Hildesheimer Gummiwarenfabriken Gebr. Wetzell A.G., Hildesheim.
- 1,165,968, 1,165,969, and 1,165,970. **Nonskid Tire.** Continental Gummiwerke A.G., Hannover.
- 1,166,305. **Apron.** Lincas Gummiwarenfabrik G.m.b.H., Berlin-Charlottenburg.

- 1,166,422. **Block Belt.** Franz Clouth Rheinische Gummiwarenfabrik A.G., Köln-Nippes, and Isbeg Industrie & Schiffbedarf G.m.b.H., Berlin W. 9.
- 1,166,473. **Inflatable Figure.** J. Fiege, Düsseldorf.
- 1,166,983. **Heel Patch.** K. Roffeis, Berlin N. 20.
- 1,167,061. **Hammer.** Allgemeine Elektrizitäts-Gesellschaft, Berlin N.W. 40.
- 1,167,235. **Nonskid Tire.** Continental Gummiwerke A.G., Hannover.

Trade Marks

United States

- 281,561. **The Legionnaire.** Footwear. W. L. Douglas Shoe Co., Brockton, Mass.
- 281,574. **Dresport.** Soles. Avon Sole Co., Avon, Mass.
- 281,596. **A. T. V.** Sanitary belts. A. Stein & Co., Chicago, Ill.
- 281,634. Representation of the sun with rays extending therefrom, and the words: "**Elsol Parche Non-Plus-Ultra.**" Inner tube cold patch. J. M. Lopez, doing business as Lopez Auto Accessories and Lopez Garage & Machine Shop, San Antonio, Tex.
- 281,663. Circle containing representation of two hands drawn in a modernistic manner. Gloves, etc. Franz Gutmann & Weinberg G. m. b. H., Chemnitz, Germany.
- 281,701. **Re-fix-it.** Liquid leather for mending rubber shoes, etc. H. Schaffer, doing business as So-Lether Mfg. Co., St. Paul, Minn.
- 281,706. **Serpent.** Engine packing and jointings. Beldam Packing & Rubber Co., Ltd., London, England.
- 281,712. **Velva-Turf.** Rubber-backed pile fabric for miniature golf courses. Republic Rubber Co., Youngstown, O.
- 281,726. **Federal.** Cements and guns. Federal Rubber Co., Cudahy, Wis.
- 281,769. **Condor.** Hose. Raybestos-Manhattan, Inc., Passaic, N. J.
- 281,774. **Naptol.** Petroleum derivative used in rubber goods manufacture. Sinclair Refining Co., New York, N. Y.
- 281,859. **Kar Kusion.** Cushions. D. L. Irvin, New York, N. Y.
- 281,860. **Airblown.** Cushions. D. L. Irvin, New York, N. Y.
- 281,924. **Bat.** Golf balls. Bon-Dee Golf Ball Co., Detroit, Mich.
- 281,927. **Ajax.** Traveling bag toilet articles and fittings. Vulcanized Rubber Co., New York, N. Y.
- 281,943. **E & H.** Footwear. Eisenstein & Herrmann, Prague, Czechoslovakia.
- 281,946. Circle containing pictorial representation of a shoe sole, and outside the circle the words: "**Gilash Triple Wear.**" Soles. G. H. Gillis, Fitchburg, Mass.
- 281,953. **Teal.** Waterproof fabric. E. I. du Pont de Nemours & Co., Wilmington, Del.
- 281,964. **Ce-me-not.** Footwear. R. P. Hazzard Co., Gardiner, Me.
- 281,989. **Willow.** Hot water bottles and fountain syringes. Kaufmann Department Stores, Inc., Pittsburgh, Pa.

- 282,036. **The For Ever Shoe.** Footwear. The Brněnská, Továrna Na Obuv Akciová Společnost, Brno, Czechoslovakia.
- 282,060. An oval containing the words: "**Coinsworth Chicle Ball Gum.**" Chewing gum. Coin Service Corp., New York, N. Y.
- 282,104. Ellipse containing the words: "**Betsy Perkins. Strawbridge & Clothier.**" Footwear. Strawbridge & Clothier, Philadelphia, Pa.
- 282,169. **Patriot.** Tires and tubes. B. F. Goodrich Co., New York, N. Y.
- 282,191. **Pignose.** Faucet washers. Kirkhill Rubber Co., Los Angeles, Calif.
- 282,215. Word: "**Wrinkle-tex,**" between two slightly curved lines. W. H. Lichtenstein, doing business as Peerless Garment Co., Boston, Mass.
- 282,218. **Dry-Lox.** Bathing caps. Youngs Rubber Corp., Inc., New York, N. Y.
- 282,236. **"Ezy-Rub."** Floor mats and rugs. Toledo Rubber Products Corp., Toledo, O.
- 282,237. **Turf-Tex.** Sponge rubber for miniature golf courses. Carnie-Goudie Mfg. Co., Kansas City, Mo.
- 282,240. **Four Bucks.** Footwear. C. H. Daniels, Boston, Mass.
- 282,268. Circle containing the letters: "**PST.**" Smith Power Transmission Co., Cleveland O.
- 282,340. Insulated wire covering consisting of a series of diamond shaped figures made up of yellowish brown, red, and black strands. Insulated wire. Packard Electric Co., Warren, O.
- 282,389. **Free-Flex.** Footwear. Melville Shoe Corp., New York, N. Y.
- 282,401. **Insolox.** Rubber and fiber soles. United States Rubber Co., New York, N. Y.
- 282,426. **Banner.** Golf balls. Arlington Rubber Co., Dorchester, Mass.
- 282,450. Representation of the globe and thereupon, the words: "**Globe Trotters.**" Golf balls, etc. T. A. Egan, Los Angeles, Calif.
- 282,462. **Banco.** Golf Balls, etc. Dayton Co., Minneapolis, Minn.
- 282,511. **Sandy.** Golf balls. Arlington Rubber Co., Dorchester, Mass.
- 282,512. **Tema.** Table tennis balls. John Jaques & Son, Ltd., London, England.

Dominion of Canada

- 51,793. Modernistic representation of a young woman sitting with her hands folded across her knees, upon a high-heeled slipper, and the words: "**Marilyn Shoes,**" followed by the words: "**Beautiful Footwear.**" Footwear. M. Weingarden, Windsor, Ont.
- 51,849. **Trader.** Erasers, etc. Eagle Pencil Co., New York, N. Y., U. S. A.
- 51,850. **Grenadier.** Erasers, etc. Eagle Pencil Co., New York, N. Y., U. S. A.
- 51,859. **Cavaltex.** Rubber coated fabrics. Canadian Industries, Ltd., Montreal, P. Q.

United Kingdom

- 515,325. **Hydro.** Brake and clutch linings. Allied Asbestos & Rubber Co. Export, Inc., New York, N. Y., U. S. A.

- 518,987. Square consisting of representations of a man on a motorcycle, an automobile, an airplane, a man and a woman in the rain, and a map of the world, and the words: "**The All Round Weatherwear.**" Clothing. G. Abrahams, trading as Progress Rubber & Leather Co., Manchester.
- 519,272. **Webfoot.** Clothing. Jantzen Knitting Mills, Ltd., Brentford, Middlesex.
- 520,044. **Vulcel.** Chemicals for rubber manufacture. British Dyestuffs Corp., Ltd., Blackley, Manchester.
- 520,045. **Vulcaflex.** Chemicals for rubber manufacture. British Dyestuffs Corp., Ltd., Blackley, Manchester.
- 520,047. **Vulcatrux.** Chemicals for rubber manufacture. British Dyestuffs Corp., Ltd., Blackley, Manchester.
- 520,439. **Blue Flash.** All goods included in Class 49. Dunlop Rubber Co., Ltd., Fort Dunlop, Birmingham.
- 520,449. Circle containing modernistic designs. Rubber Goods. Turners Asbestos Cement, Ltd., Manchester.
- 520,645. **Pylon.** Flooring. George Spencer, Moulton & Co., Ltd., London, S. W. 1.
- 520,830. Representation of a chewing gum wrapper and the words: "**Kis-Me Bubblers.**" Chewing gum, etc. American Chicle Co., Long Island City, N. Y., U. S. A.
- 520,954. **Red Flash.** All goods included in Class 49. Dunlop Rubber Co., Ltd., Fort Dunlop, Birmingham.
- 520,955. **Green Flash.** All goods included in Class 49. Dunlop Rubber Co., Ltd., Fort Dunlop, Birmingham.
- 521,485. **Kirtcomp.** Rubber goods. Kirtland & Co., Ltd., London, S.E.1.

Designs

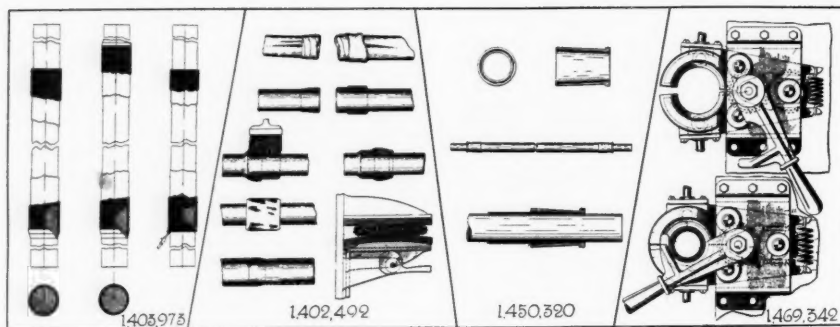
United States

- 83,804. **Tire.** Term 14 years. A. Hargraves, Akron, O.
- 83,854. **Athletic Shoe.** Term 3½ years. A. S. Funk and E. S. Bott, assignors to La Crosse Rubber Mills Co., all of La Crosse, Wis.
- 83,872. **Eyelash Curler.** Term 14 years. W. E. McDonell and C. W. Stickel, both of Rochester, N. Y.
- 83,887. **Sole.** Term 14 years. H. H. Wydom, Boston, Mass., assignor to the B. F. Goodrich Co., New York, N. Y.
- 84,008. **Tire.** Term 7 years. S. P. Thacher, assignor to Morgan & Wright, both of Detroit, Mich.
- 84,009. 84,010. 84,011. 84,012. 84,013. 84,014. 84,015. 84,016. 84,017 and 84,018. **Toy.** Term 7 years. L. Turchanyi, Sashalom, assignor to Hungarian Rubber Goods Factory, Ltd., Budapest, both in Hungary.

Dominion of Canada

- 9,076. **Golf Ball.** India Rubber. Gutta Percha & Telegraph Works Co., Ltd., London, England.
- 9,102 and 9,103. **Overshoe.** Dominion Rubber Co., Ltd., Montreal, P. Q.
- 9,121. **Overshoe.** Dominion Rubber Co., Ltd., Montreal, P. Q.
- 9,122. **Tire.** Dominion Rubber Co., Ltd., Montreal, P. Q.

Making Inner Tubes



THE following abstracts of United States patents relating to the manufacture of inner tubes are continued from INDIA RUBBER WORLD, May 1, 1931:

43. Palmer and Irvin, 1,305,666. June 3, 1919. This is a machine for telescopically folding a flexible tube, including two means adapted to grasp different and connected portions of the tube within its length and being relatively movable to telescopically fold one of the portions over the other of the portions.
44. Jeffries, 1,309,687. July 15, 1919. The following is a process of manufacturing a pneumatic tube by cementing unvulcanized strips of rubber to an unvulcanized foundation, cutting the loose edge of the strips toward the fixed edge to produce flaps, placing the strips in contact with a mandrel, and then applying pressure to the exterior foundation and vulcanizing.
45. Robert, 1,310,436. July 22, 1919. Making inner tubes consists in placing two flat sheets of stock across the mouths of annular grooves in mold members, placing a headed nipple across the inner edge of one of the sheets, bringing the two mold members together, holding the sheets taut, drawing the nipple outwardly to make a tight engagement of its head with the inner face of the rubber stock, pneumatically forcing the stock into the grooves, and vulcanizing the parts together while the stock and nipple are so held.
46. Harrison, 1,311,392. July 29, 1919. Joining rubber tubes by cold vulcanization consists in rolling back one end of the tube upon itself for a given distance, in applying cement to the rolled back surface and to the other end of the tube for a similar distance, in fitting the last named end to the rolled back end of the tube with a butt joint, in applying a cold vulcanizing solution to the cemented portions, in inflating the tube and bringing the rolled back portion upon the other end of the tube with the cemented surfaces in lapped relation, in thereafter applying pressure to the joint until cured.
47. Armstrong, 1,311,738. July 29, 1919. The process of forming a tube comprises: rolling sheet rubber upon a straight mandrel of a length slightly greater than the circumference of the finished tube until sufficient rubber is produced to form the innermost section of the tube; applying longitudinally on one side of this roll in layers of unequal width a semi-liquid vis-
- cous composition; rolling on the outside of the innermost section more sheet rubber to form the outermost section of the tube; removing the tubular structure from the mandrel and bending it into annular form and substantially uniting the ends thereof; and vulcanizing the entire mass.
48. Orr, 1,317,665. Sept. 30, 1919. Splicing inner tubes consists in applying vulcanizable material to a portion of the splice, and treating the remainder to hold together the abutting ends of the tube while the splice is being united by vulcanization of the vulcanizable material.
49. Macbeth, 1,323,706. Dec. 2, 1919. The method of molding inner tubes having butt ends comprises applying to the tube ends an unvulcanized core piece which shapes the ends of the tube; placing the tube and core piece so fitted together in a mold; and vulcanizing the tube.
50. Bugg, 1,329,954. Feb. 3, 1920. The process of making an inner tube consists in helically winding an outer member of the tube on a circular mandrel half round in cross section; slitting the outer member on its flat side and stripping it from the mandrel; helically winding an inner member on a circular mandrel half round in cross section; slitting the inner member on its flat side and stripping it from its mandrel; and securing together the corresponding flat sides of the outer and inner members to form a completed inner tube.
51. Tyler, 1,332,779. Mar. 2, 1920. The method of forming an inner tube comprises cutting a sheet of material into a series of strips arranged for feeding in parallel paths and then rotating and moving the mandrel transversely of the paths along which the strips of material are fed, connecting the first strip to the mandrel, and connecting the other strips in succession to the strips wound on the mandrel so that the strips are wound on the mandrel in layers to form the tube.
52. Lowe, 1,337,930. Apr. 20, 1920. In a tire tube making apparatus, a curing mold embodying oppositely arranged separable mold sections is accomplished by having tube receiving channels in opposed and mating relation to each other, a stock holding and shaping mandrel removably mounted therein, and combined means carried by the mandrel for tapering the ends of the tubes and spacing the mandrel from the walls of the mold.
53. Dech, 1,340,702. May 18, 1920. An inner tube is made by building up on a core a tube blank having a circumferential gap in its inner wall and having its edges adjacent the gap formed into inwardly projecting ribs; vulcanizing the tube blank; removing the blank from the core; inserting into the blank clamping means adapted to engage the outer faces of the ribs; inserting locking means between the ribs to force them into tight engagement with the clamping means.
54. Dech, 1,340,703. May 18, 1920. An inner tube is made by building up on an open bellied core a tube blank having a slit in one of its edges provided with an enlarged chamber and a projecting tongue on its other edge having an enlarged bead; vulcanizing the tube blank; removing it from the core; and finally sealing the opening in the tube blank by inserting the tongue into the slit so that the bead on the tongue rests in the enlarged chamber of the slit.
55. Dech, 1,340,704. May 18, 1920. An inner tube is made by building up on a core an open bellied tube having one of its edges reduced in size and a slit in its other edge to receive the reduced edge; vulcanizing the tube; removing the tube from the core; turning the tube inside out; and sealing the tube by inserting the reduced edge of the tube into the slit in the other edge.
56. Hampton, 1,342,441. June 8, 1920. A tube is spliced by inserting inner sleeves in end portions of the tube, and overlapping end portions of an outer sleeve on the end portions of the tube, adjacent faces of tube and sleeves being gum-treated, securing outer faces of the inner sleeves to inner faces of the tube, and securing inner faces of the outer sleeve to outer faces of the tube.
57. Roberts, 1,346,848. July 20, 1920. Hollow rubber articles are made by fastening rubber sheets across the mouths of mold cavities by pneumatic pressure supplied in regions outside of the cavities, pneumatically seating stock in such cavities, bringing such seated stock together and cutting off from the surrounding margin.
58. Dech, 1,354,174. Sept. 28, 1920. An inner tube is made by building the major part of the tube on a curved mandrel; vulcanizing the part; removing it from the mandrel; placing a section of similar tubular form and having laterally extending sleeves between and abutting the ends of

the part with the sleeves projecting within the part; and vulcanizing the ends and section together.

59. Stratford, 1,358,124. Nov. 9, 1920. The method of making rubber tubes consists in curing an endless hollow tube while maintaining all parts of the tube in a curved but non-annular condition.

60. Knecht, 1,374,584. Apr. 12, 1921. The apparatus is designed to mold the rubber directly from the mills or mixers upon the forming pole and thus eliminate the calenders or sheet makers.

61. Marquette, 1,385,220. July 19, 1921. Tubes are joined by folding one section of tube upon a mandrel, holding a second section of tube distended by suction applied to its outer surface, locating the mandrel with the first section thereon within the distended portion of the second, and releasing the distended portion of the second section in order that it may contract upon the first section.

62. Roberts, 1,387,616. Aug. 16, 1921. The apparatus is designed to hold annular rubber stock upon the faces of mold members and pneumatically seat such stock in annular channels in the mold members and join the parts of the seated stock together to produce the complete article with the peripheral seams.

63. Combs, 1,398,940. Nov. 29, 1921. The method comprises coating textile fabric on both sides with unvulcanized rubber gum, then folding the fabric backward and forward upon itself so as to form a plurality of closely spaced plait-like folds, then joining the lateral edges of the fabric in the form of a tube and subjecting it to vulcanization.

64. Grote, 1,402,492. Jan. 3, 1922. The ends of rubber tubes are spliced by properly treating and telescoping the ends, and clamping the ends between opposed jaws with provision for restricting the lateral spreading of the rubber under the pressure of the jaws. (See group illustration.)

65. Moomy, 1,403,973. Jan. 17, 1922. The method of jacketing rubber tubes consists in enveloping the tube with a jacket and contracting the jacket transversely upon the tube. (See group illustration.)

66. McRoberts, 1,406,669. Feb. 14, 1922. The method includes, plying up a sheet of rubber on a mandrel, coating the exposed surface of the resulting tube with mica except immediately adjacent the exposed seam, confining the coated tube with fabric under tension, and vulcanizing the tube thus confined on the mandrel.

67. Stoner, 1,424,386. Aug. 1, 1922. Vulcanizing tire tubes consists in pressing the tube into intimate contact with the mandrel carrying the same by the application of circumferential pressure applied progressively from adjacent one end of the tube toward its opposite end and then vulcanizing the tube in an open steam vulcanizer while the contact is maintained and after the removal of the pressure applying means.

68. Marquette, 1,428,382. Sept. 5, 1922. The method of making rubber tubes consists in winding a strip of rubber helically about a mandrel with the successive turns of the strip having their edges overlapped, temporarily compressing the tube against the mandrel by a strip of fabric wound helically about the tube so formed in a

direction opposite to that of the rubber strip, and vulcanizing the tube.

69. Moomy, 1,433,291. Oct. 24, 1922. The tube is rolled on a pole which is heated to make the rubber more plastic and also to expel any untrapped air or moisture. The tube is wrapped; the wrapping remains on the tube while warm and as the material is plastic, the edge of the material from which the tube is formed is smooth. After the tube is cool while in the wrapping and before the vulcanizing, the wrapper is removed, permitting inspection and showing whether air or moisture is trapped and if so it may be removed. The tube is then vulcanized without the wrapping.

70. Little, 1,450,320. Apr. 3, 1923. Tubes are prepared for vulcanization by sliding over the end of the tube a member having a tapered internal bore; the friction between the member and the tube is less than that between the tube and mandrel. (See group illustration.)

71. Mahoney, 1,453,852. May 1, 1923. This invention provides a machine for making tubing of rubber or similar material directly from sheet stock without the necessity of cutting, rolling, hammering, or cementing the stock.

72. Porter, 1,454,074. May 8, 1923. The method of making an inner tube comprises uniting side edges of pieces of elastic material containing parallel reinforcing strands running at opposite angles to such side edges to make up a sheet and forming such sheet into a tube.

73. Stephenson, 1,455,364. May 15, 1923. Inner tubes are made by covering a pole with rubber; applying a valve-base to the exterior of the tube; inserting a hole forming member into the tube through the center of the reinforcing valve-base, confining the tube and hole forming member; vulcanizing the tube; removing from the pole and turning it inside out; splicing the ends; and finally mounting a valve in the hole thus formed therein.

74. Bowerman, 1,456,357. May 22, 1923. The method consists in cutting a hole in the rubberized fabric laminations of a valve pad leaving the edges of the hole unrubberized; building the pad into the unvulcanized rubber tube; locating the tube and the pad together on a mandrel so that one end of the hole in the pad laminations is closed by the mandrel and the other by the tube rubber; and vulcanizing tube and pad together, whereby gases from the fabric laminations are afforded a path into the pocket thus formed by the hole and are held there harmlessly during vulcanization.

75. Fuller, 1,461,000. July 3, 1923. The method of making inner tubes consists in forming a tube from rubber composition, making a reinforcing valve base with a central opening, assembling the valve base and tube, setting a hole cutting element in the opening in the reinforcing valve base and curing the tube.

76. Henderson, 1,463,528. July 31, 1923. The method of forming fabric reinforced tubes comprises positioning on a sheet of rubber two series of fabric strips so that individual strips will be in crossing relation in the completed tube, and rolling the sheet into a tube.

77. Henderson, 1,463,529. July 31, 1923. The method comprises a template provided with diagonal slots adapted to position

fabric strips in oppositely disposed formation within the body of the tube.

78. McLane, 1,463,708. July 31, 1923. The method consists in constructing a tube having embedded in the walls a series of parallel weightless cords laid closely together and extending from one side of an outer circumferential zone, directly beneath the tread of the casing, around the tube and terminating at the opposite side of the zone portion. This series of cords extends from the rim side of the tube and preferably diagonally about the tube, whereby the tube is reinforced especially along its sides to protect the casing at the point where it is weakest and subject to constant strain, while securing resiliency and expansion.

79. Stevens, 1,469,342. Oct. 2, 1923. The method of forming inner tube splices comprises supporting the splice between two rigid surfaces, exerting a yielding pressure on the splice, and vulcanizing the splice. (See group illustration.)

80. Palmer, 1,472,435. Oct. 30, 1923. The process of forming a tube consists in spirally winding a strip of rubber or the like on a supporting mandrel, excluding air from between the mandrel and strip during the operation of winding, confining the ends of the spirally wound tube to exclude the air, and immediately vulcanizing the tube on the mandrel.

81. Henderson, 1,472,756. Oct. 30, 1923. The method of forming reinforced plural ply rolled rubber tubes consists in rolling a sheet of rubber into tubular form and applying to the ultimately interior surface a strip bearing reinforcing fabric elements; the opposite side edges of the rolled sheets are spaced apart circumferentially of the rolled tube to provide an interval of reduced diametrical thickness for the reception of the strip.

82. Falor, 1,481,892. Jan. 29, 1924. An annular rubber tube is vulcanized by enclosing in a mold and pressing it against the walls by a hot pressure fluid injected tangentially at a point remote from the wall of the tube. The fluid is injected in one tangential direction only so as to cause a complete circumferential circulation of fluid in tube.

83. Harders, 1,481,902. Jan. 29, 1924. The method of preparing for vulcanization a tube positioned upon a mandrel and wrapped with a strait-jacket under tension comprises the application of pressure coincidentally to a relatively small part of the surface of the tube progressively along the tube.

84. Cady, 1,498,864. June 24, 1924. A method of indicating the point to punch inner tubes in the center of their valve-bases consists in assembling vulcanizable rubber composition and a valve-base, locating a migratory substance of a color contrasting with the rubber when vulcanized in a line passing through the center of the valve-base, vulcanizing the tube and causing migration of the contrasting colored substance, and forming an aperture in the inner tube at the point indicated by the contrasting color.

85. Russell and Stevens, 1,499,752. July 1, 1924. Splicing pneumatic tubes comprises cementing such tubes together with a rubber cement containing sulphur and an ultra-accelerator.

(To be continued)

FRANCE

(Continued from page 88)

The 1930 imports were distributed as follows: from Great Britain, 67,118,000 francs; Belgium, 66,058,000 francs; United States, 49,505,000 francs; Germany, 42,279,000 francs; Italy, 10,165,000 francs; Canada, 2,217,000 francs; and other countries, 7,617,000 francs. Increases in imports from England, Germany, and Belgium are particularly noteworthy, compared with 1929 figures being 39.3 per cent, 36.8 per cent, and 25 per cent, respectively.

The most important items were tires and tubes, which increased from 25,957 to 43,095 quintals; bicycle tires and tubes, 6,453 to 11,620 quintals; footwear, 3,797 to 5,440 quintals; hard rubber goods, from 1,412 to 1,524 quintals; apparel, rubberized and elastic goods, 2,233 to 3,233 quintals; toys, from 216 to 254 quintals. On the other hand the drop was sharp in the imports of insulated wires and cables, which were 34,371 quintals in 1930 against 70,769 in 1929. This decrease was due to the considerable fall in the imports of lead-sheathed cables.

The most striking reductions in exports were in tires and footwear. Whereas in 1928 the total exports of tires and tubes including solid tires and tires and tubes for bicycles came to 225,411 quintals, value 598,091,000 francs, this shrank to 195,599 quintals, value 464,011,000 francs, in 1929, and in 1930 to 162,865 quintals, value 387,815,000 francs. As far as 1929 and 1930 are concerned, the shrinkage is mainly due to the decreased shipments of pneumatic tires and tubes for vehicles, which had been 148,008 quintals and 117,003 quintals.

Turning to footwear we find that the 1930 exports have been reduced almost by half as compared with 1928, the shipments for 1928, 1929, and 1930 having been 35,206 quintals, value 54,192,000 francs, 27,462 quintals, value 40,483,000 francs, and 18,690 quintals, value 28,750,000 francs, respectively. A progressive decline is to be noted for almost all the countries to which France ships footwear; the most spectacular was Czechoslovakia, which in 1928 had bought from France 5,606 quintals of rubber footwear, in 1929, 3,552 quintals, and in 1930 only 513 quintals.

Exports of rubberized fabrics fell from 7,313 quintals in 1929 to 4,679 quintals in 1930; elastic fabrics from 2,448 to 2,050 quintals; hard rubber in sheets, rods, etc., from 709 to 555 quintals. Among the few items of export which show increases may be noted manufactures of hard rubber as trinkets, combs, cigarette holders, sanitary goods, and insulations, which were 1,867 in 1930 instead of 1,810 quintals as in the year before; and packing, which increased from 1,210 quintals in 1929 to 1,867 quintals.

POLAND

The *Gummi-Zeitung* learns that the Polish rubber industry is going through a serious crisis. Representatives of the leading rubber factories are negotiating with French capitalists for a loan of 20,000,000 francs. A particularly bad sign is that the well-known rubber goods concern, Pegepe, in Graudenz, is now in financial

difficulties. A moratorium agreement has been made with foreign firms supplying raw materials. It is learned that on April 10 the factory workers went on strike as they had received no wages for three weeks.

Previous to the World War but one rubber factory was in Poland, the Wolbrom factory, established in 1911 to manufacture technical goods. It was not until after the war that the real development in the Polish rubber industry began, since then it has expanded so rapidly that while in 1924 goods to a value of 323,000 zloty (zloty = \$0.1122) were exported, the total exports reached 12,400,000 zloty in 1929.

However there has been overproduction in certain lines, particularly footwear, since the factories have concentrated on footwear and technical goods, and have neglected tires, surgical rubber goods, and to a certain extent druggists' sundries. Expansion of the Polish rubber industry is handicapped by the lack of capital.

Imports increased until 1929 when the figure 50,100,000 zloty for rubber, gutta percha, and manufactures thereof already represents a decrease on the totals for the preceding year, a decrease still further accentuated in 1930 when the figures came to 39,600,000 zloty.

The chief sources of supply are Great Britain, United States, Soviet Russia, Germany, France, Belgium, Czechoslovakia, Sweden. Imports in 1930, however, declined from all countries, except Great Britain, Soviet Russia, and Belgium. The increase in the share of Soviet Russia is especially noteworthy; whereas in 1929 it ranked fifth among the list of suppliers, in 1930 it was third. Sweden suffered most as a result of the increase in Soviet shipments to Poland; whereas in 1929 her exports to Poland had come to 1,813,000 zloty, in 1930 this had dropped to 250,000 zloty.

RUSSIA

During the period 1929-30 (October-September) Russia imported 16,011 tons of crude rubber, value 13,743,000 rubles, against 10,638 tons, value 9,592,000 rubles. A comparatively small quantity of rubber goods was imported, 298 against 295 tons, of which America supplied 150 tons against 38 tons; while Germany sent 81 tons against 177 tons. The exports of rubber manufactures during the period under review came to 3,332 tons, value 7,799,000 rubles, against 4,275 tons, value 9,884,000 rubles. Germany, which took 806 tons, value 2,159,000, appears to have been among the best customers. These also included Latvia and England, which took small amounts of goods.

The Moscow rubber factory "Kauchuk" fulfilled its five-year plan by April 1, or within 2½ years, according to the *Economic Review* of the Soviet Union. Its output between April 1, 1930, and April 1, 1931, was 42,923,000 rubles, as compared with 42,268,000 rubles set in the plan.

The reduction in production costs, as compared with 1927-28, was 30.6 per cent, whereas the plan called for a lowering of only 22.6 per cent during the first three years of the five-year plan period. Capital construction costs were also reduced by 10 per cent below the amount called for in the plan.

NETHERLANDS EAST INDIES

(Continued from page 90)

The six trees composing the clone Planterstrots 2 produced an average of 8.9 kilos per tree per annum, but it should be noted that three of the six trees had to be taken out of the tapping round because of brown bast, a disease to which the clone seems susceptible.

Of Planterstrots 3, 7 trees gave an average of 7.8 kilos per tree per annum; of Planterstrots 5, 23 trees averaged 6.1 kilos; and Planterstrots 6, with 14 trees, averaged 6.7 kilos per tree per annum. These yields appear to have been fairly constant for the last three years.

Treating Brown Bast

The A. V. R. O. S. Association of Rubber Planters of East Coast of Sumatra, Experiment Station, advises planters to change their methods of treating brown bast. It is now recommended merely to isolate the parts in diseased areas with a diameter of less than 10 cm. and not to scrape them; while such trees may be tapped as usual and, if necessary, over the diseased part.

Where the diameter of the affection is more than 10 cm., the area is isolated by a cut as in small affections, and the outer layer of bark is scraped off. The tree is tapped with a shorter cut which is not to go over the scraped part. It is advised to stop tapping those trees which normally produce less than 20 cc. latex per tapping and not to treat them.

INDO-CHINA

A new law, effective April 4, 1931, has been passed according to which French rubber growing colonies may set up and finance compensation funds, to a maximum of 50,000,000 francs, out of which export premiums will be paid on rubber shipments, in order to assist the French rubber producer. The money to be paid out will be recovered from the proceeds of a French import duty of 30 centimes which is now being collected on all rubber imported into France, as well as on the rubber content of goods imported, and which are to be set aside for the purpose.

The premiums paid to planters are to be granted at times when production costs are higher than market prices, to make up the difference between the two, but at no time must the amount paid exceed 3 francs per kilo.

When price of rubber and cost of production are equal, compensation will stop. Planters will have to begin paying back the amounts advanced to them when the average price for three months exceeds the cost of production by 3 francs per kilo, at rates ranging from 4 per cent to 10 per cent of the selling price, depending on the market quotations.

When the system is suspended, any surplus remaining over the fixed maximum to be collected will be used for scientific research to improve production.

The import duty, it is provided, will be reduced as the totals of the refunds reach the required amount, to be increased again when these fall.

Market Reviews

Crude Rubber

New York Exchange

THE rubber market has recovered much of the ground lost last month. Most of the gains have followed announcements of renewed restriction meetings; so a word about restriction will be pertinent.

The rubber industry is in such a demoralized condition—with manufacturers reported to have lost some \$50,000,000 in the first quarter—that efforts are being made on all sides to pull the industry out of the red.

Because of this condition it seems almost certain that a scheme of some sort will be adopted. It may not be beneficial in the long run, but manufacturers and growers find it almost imperative to do something toward extricating themselves from their predicament.

Negotiations now going on at the Hague are said to have the sanction of the Dutch government. That is fine, but the poor results from former restriction schemes will make growers wary of any plan unless it can be proved to be sound. One plan offered calls for the cooperation of American manufacturers. Rubber would be sold to them at a fixed price, which would yield only a small profit to the growers.

Although the market has recovered substantially, the statistical position has not been altered materially. Record stocks were accumulated in this country during April, and stocks abroad are adequate for many months' supply.

The declining shipments from the Far East were encouraging. If a reduction is also shown in the May shipments from

Malaya, it will indicate that native growers have found the low prices unprofitable, and that if consumption improves, the overwhelming stocks on hand may be reduced.

Week ended May 2. Shipment figures for the Dutch East Indies depressed the market in the first half of the week so that rubber retreated to the record low price of 5.70 cents. Then in the second half the shipment figures from Malaya helped to firm up prices to close from 20-25 points up from the lows reached in the middle of the week.

Dutch East Indies shipments for March totaled 24,178 tons, compared with 21,414 tons in February, and with 23,855 tons in March, 1930. Estate stocks at the end of March were 22,492 tons, against 25,056 tons in February, and 22,206 tons at the end of March, 1930. Dealers' stocks, except Singapore and Penang, for the corresponding dates were 20,830, 21,759, and 17,000 tons, respectively.

Malayan shipments for April amounted to 43,453 tons, a decline of more than 5,000 tons from the March figure, and slightly lower than estimates of 44,000 tons. Ceylon shipments in April declined to 3,487 tons from the total of 6,213 tons during March.

The first reaction to these figures was to ascribe the falling off in shipments to curtailed production—the extremely low prices that have prevailed certainly lend support to such an assumption—but traders are waiting for the April census figures before they are willing to say definitely that there are signs of curtailed production.

Arrivals in New York will probably exceed consumption again, because consump-

RUBBER BEAR POINTS

1. Stocks in this country rose to a record high during April at 228,382 long tons, compared with 217,804 at the end of March, and with 148,272 at the close of April last year.
2. Losses by manufacturers in the rubber industry are estimated at \$50,000,000 for the first quarter of this year, because of inventory depreciation.
3. Consumption for the first four months amounted to 123,463 long tons, compared with 145,516 tons during the same period last year.
4. Stocks in London and Liverpool are close to 140,000 tons.
5. No definite assurance can be given that the restriction meetings now in process will help the industry.

RUBBER BULL POINTS

1. The government is apparently working with the Dutch rubber growers on restriction.
2. Production in the Far Eastern estates of less than 100 acres was 11,925 tons in April, compared with 18,356 in March.
3. Production in the Far Eastern estates of more than 100 acres was 17,039 tons in April, compared with 18,913 tons in March.
4. Stocks on estates at the close of April totaled 21,406 tons, compared with 22,492 tons at the close of March.
5. Dealers' stocks at the close of April were 18,789 tons, contrasted with holdings of 20,830 tons at the end of March.
6. Malayan shipments during April amounted to 43,453 tons, compared with 48,500 in March.
7. Ceylon shipments declined from 6,213 tons in March to 3,487 in April.
8. Estimates for May consumption are put at 37,000 or 38,000 tons, compared with 33,321 during April, and 39,902 during May, last year.
9. Tire stocks in hands of dealers averaged 78.4 casings per dealer on April 1, compared with 83 tires per dealer on the same date a year ago.
10. Dealers' stocks of crude rubber in Malaya in April amounted to 42,467 tons, compared with 45,607 tons at the end of March.
11. Arrivals during the first four months of this year were 160,729 tons, compared with 186,447 tons in the same period last year.

The Rubber Exchange of New York, Inc.

DAILY MARKET FUTURES—RIBBED SMOKED SHEETS—CLEARING HOUSE PRICES—CENTS PER POUND—NO. 1 STANDARD CONTRACTS

POSITIONS 1931	April, 1931				May, 1931										
	27	28	29	30	1	2	4	5	6	7	8	9	11		
Apr.	5.82				5.90	5.90	6.09	6.09	6.10	6.35	6.35	6.25	6.60		
May	5.83	5.80	5.78	5.80	5.90	5.90	6.09	6.09	6.10	6.35	6.35	6.25	6.60		
June	5.95	5.87	5.84	5.85	5.95	5.95	6.13	6.13	6.17	6.42	6.40	6.31	6.67		
July	6.05	5.95	5.91	5.90	6.00	6.00	6.16	6.18	6.23	6.50	6.47	6.37	6.75		
Aug.	6.15	6.04	6.00	5.98	6.06	6.06	6.20	6.25	6.31	6.56	6.55	6.45	6.82		
Sept.	6.25	6.14	6.09	6.07	6.13	6.13	6.25	6.33	6.38	6.61	6.63	6.54	6.90		
Oct.	6.35	6.23	6.18	6.17	6.21	6.21	6.34	6.42	6.47	6.68	6.71	6.62	6.98		
Nov.	6.45	6.32	6.27	6.27	6.31	6.31	6.43	6.51	6.55	6.76	6.79	6.69	7.06		
Dec.	6.55	6.41	6.36	6.37	6.42	6.39	6.53	6.60	6.63	6.83	6.86	6.76	7.15		
1932															
Jan.	6.66	6.52	6.48	6.46	6.50	6.49	6.62	6.68	6.72	6.94	6.98	6.89	7.23		
Feb.	6.75	6.60	6.55	6.55	6.58	6.57	6.70	6.75	6.81	7.02	7.02	6.90	7.28		
Mar.	6.83	6.68	6.66	6.64	6.66	6.64	6.78	6.83	6.90	7.10	7.05	6.95	7.33		
Apr. ....	...	...	...	...	6.75	6.73	6.87	6.92	6.99	7.18	7.12	7.05	7.41		

POSITIONS 1931	May, 1931											May, 1931			
	12	13	14	15	16	18	19	20	21	22	23	25			
Apr.	6.44	6.31	6.35	6.65	6.53	6.50	6.80	6.60	6.58	6.65	6.65	6.55			
May	6.53	6.36	6.41	6.71	6.59	6.56	6.88	6.68	6.66	6.74	6.73	6.63			
June	6.62	6.41	6.46	6.77	6.65	6.62	6.97	6.77	6.75	6.83	6.80	6.72			
July	6.69	6.50	6.55	6.86	6.73	6.70	7.06	6.87	6.85	6.93	6.90	6.81			
Aug.	6.77	6.60	6.65	6.95	6.82	6.79	7.15	6.97	6.94	7.04	7.01	6.90			
Sept.	6.84	6.67	6.71	7.03	6.89	6.87	7.21	7.05	7.02	7.11	7.07	6.97			
Oct.	6.90	6.73	6.78	7.10	6.96	6.95	7.28	7.12	7.09	7.17	7.13	7.03			
Nov.	6.96	6.80	6.85	7.17	7.03	7.03	7.37	7.20	7.17	7.24	7.20	7.10			
1932															
Jan.	7.04	6.87	6.92	7.24	7.12	7.11	7.45	7.24	7.21	7.30	7.26	7.18			
Feb.	7.10	6.93	6.99	7.30	7.20	7.18	7.53	7.31	7.28	7.37	7.33	7.25			
Mar.	7.17	6.99	7.06	7.36	7.27	7.25	7.60	7.39	7.37	7.43	7.40	7.32			
Apr.	7.25	7.07	7.13	7.43	7.36	7.33	7.68	7.47	7.44	7.50	7.47	7.40			

tion is estimated at 34,000 tons, and arrivals are estimated at about 40,000 tons.

The *Journal of Commerce* reported that Symington & Sinclair believe that the continued large shipments of Dutch rubber represent distress selling of supplies held back from last year rather than new production.

Several large automobile manufacturers reported that April automobile production was the largest this year. One large manufacturer of low-priced cars revealed that April production was above the figure set for his schedule, and close to production in April of last year.

Restriction rumors recur frequently, but they fail to affect the market since the general belief is that all efforts are futile.

The outlook has not changed very materially. A steadier undertone has been evident for a few days, but prices probably will remain close to present levels. Production figures will be watched for signs of lessened production, but even these signs are not expected to improve the market because of the large stocks of rubber on hand.

Prices at the close of May 2 on the No. 1 Standard contract appear on the next page.

adopted by the Dutch Government.

The passive attitude of the Dutch Government seems to have been overcome, in view of the announcement of the meeting mentioned above, but even so, a final paragraph to the report of the Rubber Division is pertinent:...it is now suggested in some quarters that the greater good of the industry would be served if they dropped their efforts for artificial restriction and directed them toward research and the development of new uses.

Prices at the close of May 16 on No. 1 Standard contract were:

Position	High	Low	Close	Previous Close
May			6.53	6.65
June			6.59	6.71
July	6.70	6.65	6.65	6.77/6.80
Aug.			6.73	6.86
Sept.			6.82	6.95/7.00
Oct.			6.89	7.03
Nov.			6.96	7.10
Dec.	7.12	7.12	7.03/7.07	7.17/7.19
Jan.			7.12	7.24
Feb.			7.20	7.30
Mar.	7.37	7.27	7.27	7.36/7.38
Apr.			7.36	7.43
Spot			6.46	6.70

Week ended May 23. A gain of 30 to 35 points was scored in the rubber market on Tuesday when the production figures for the native estates were released. They showed a drop in output which was taken to mean that the low level of prices had at last produced the desired effect.

The gain was not held. On the next day bear sales clipped from 16 to 30 points from the previous day's gains. After that action fluctuations were in a narrow range, with the week's prices from 10 to 15 points better. On Saturday only four lots were traded in an extremely dull market.

London and Singapore were closed on account of holidays, and will not reopen until Tuesday.

The report received from the Far East disclosed that estates of less than 100 acres in size, predominantly native, reported a production of 11,925 tons during April, compared with 18,356 tons during March.

Estates of more than 100 acres in size, comprised chiefly of European-owned plantations, reported production of 17,039 tons during the month, compared with 18,913 tons during March.

Stocks on estates at the close of the month underwent a moderate reduction, totaling 21,406 tons, compared with 22,492 tons at the close of the previous month.

Dealers' stocks amounted to 18,789 tons, contrasted with holdings of 20,830 tons at the end of March.

Meetings between the Dutch rubber growers and the government were held at The Hague on Wednesday, Thursday, and Friday to work out a rough scheme for improving the rubber industry in the Dutch East Indies, but up to Saturday no word as to the outcome of the meeting had been received in this market.

Since the meeting has official sanction, any plan produced must be favorable to the Dutch East Indian government.

One plan, calling for the cooperation of American tire manufacturers was proposed by Dr. Bernhard, Chief of the Department of Agriculture, Industry, and Commerce of the Dutch East Indies.

Dr. Bernhard suggested that crude rubber might be sold at a fixed price to the large tire companies in the United States. He feels that this action is the only remedy

for the industry if the conferences now going on do not provide an adequate restriction agreement.

According to the cable which reported Dr. Bernhard's suggestion, "The object would be to fix a joint price that would leave just a small margin of profit to the rubber industry."

Prices at the close of May 23 on the No. 1 Standard contract were:

Position	High	Low	Close	Previous Close
May			6.65	6.65
June			6.73	6.74
July			6.80/6.83	6.83/6.90
Aug.			6.90	6.93
Sept.			7.01	7.04
Oct.			7.07	7.11
Nov.			7.13	7.17
Dec.			7.20	7.24/7.26
Jan.			7.26	7.30
Feb.			7.33	7.37
Mar.			7.40/7.43	7.43/7.46
Apr.			7.47	7.50
Spot			6.70	6.70

On May 25 the markets at London and Singapore were closed. On the New York Exchange futures closed as follows: May, 6.55; July, 6.72; September, 6.90-6.92; and December, 7.10-7.15. On May 26 prices at opening were May, 6.40; July, 6.65; September, 6.85; and December, 7.10.

Price Differentials

Price differentials between the various grades of plantation rubber which shall prevail on all deliveries against the old "A" contracts, for June, 1931, are: off quality first latex crepe at one-tenth of a cent (.1c) per pound; good f. a. q. ribbed smoked sheets at twenty-five one-hundredths of a cent (.25c.) per pound; ordinary f. a. q. ribbed smoked sheets at four-tenths of a cent (.4c.) per pound.

New York Quotations

Following are New York outside market rubber quotations for one year ago, one month ago, and May 26, the current date

Plantation Hevea	May 26, 1930	April 27, 1931	May 26, 1931	South American	May 26, 1930	April 27, 1931	May 26, 1931
Rubber latex (Hevea)...	gal.\$1.25 @	\$0.75 @	\$0.75 @	PARAS—Continued			
Sheet				Islands, fine	\$0.14 3/4 @	\$0.08 1/4 @	\$0.08 1/2 @
Ribbed, smoked, spot	.14 @ .14 1/4	.06 @ .06 1/2	.06 3/4 @	Islands, fine	*.19 @	*.10 3/4 @	*.11 1/4 @
June	.14 @ .14 3/4	.06 1/4 @	.06 3/4 @	Acre, Bolivian, fine	.15 3/4 @	*.08 3/4 @	*.08 3/4 @
July-Sept.	.14 1/2 @	.06 3/4 @ .06 7/8	.07 @	Acre, Bolivian, fine	*.19 1/2 @	*.11 3/4 @	*.11 3/4 @
Oct.-Dec.	.15 @ .15 1/4	.06 3/4 @ .06 3/4	.07 1/4 @	Beni, Bolivian	.16 @	.08 3/4 @	.08 3/4 @
Jan.-Mar.	.15 1/2 @ .15 3/4	.06 3/4 @	.07 1/2 @	Madeira, fine	.15 3/4 @	.08 3/4 @	.08 1/2 @
CREPE				CAUCHO			
No. 1 Thin latex (first latex) spot	.14 1/2 @ .14 3/4	.06 1/2 @	.07 1/4 @	Upper caucho ball	.07 1/2 @	.05 @	.05 1/4 @
June	.14 1/2 @ .14 3/4	.06 3/4 @	.07 @	Upper caucho ball	*.13 3/4 @	*.07 1/4 @	*.07 1/2 @
July-Sept.	.14 3/4 @ .15	.06 3/4 @ .06 7/8	.07 1/2 @	Lower caucho ball	.07 @	.04 1/2 @	.04 3/4 @
Oct.-Dec.	.15 1/2 @ .15 3/4	.07 @ .07 1/8	.07 3/4 @	Manicobas			
Jan.-Mar.	.16 @ .16 1/4	.07 1/4 @	.08 @	Ceara negro heads	†.14 @	@	@
No. 2 Amber, spot ("B" blanket)	.13 3/4 @ .13 3/8	.06 @ .06 1/8	.06 3/8 @	Ceara scrap	†.08 @	†.08 @	†.08 @
June	.13 3/4 @	.06 1/2 @	.06 3/8 @	Manicoba, 30% guaranteed	†.16 @	†.05 @	†.05 @
July-Sept.	.14 @	.06 3/4 @ .06 3/4	.06 3/4 @	Mangabiera, thin sheet	†.16 @	†.05 @	†.05 @
Oct.-Dec.	.14 1/4 @	.06 1/2 @ .06 3/8	.07 1/8 @	Guayule			
Jan.-Mar.	.14 3/4 @	.06 3/4 @	.07 3/8 @	Duro, washed and dried	.16 1/2 @	.14 @	.14 @
No. 3 Amber, spot ("C" blanket)	.13 1/2 @	.05 3/4 @ .06	.06 1/2 @	Ampar	.17 @	.15 @	.15 @
No. 1 Brown, clean, light, thin	.13 3/4 @ .14	.06 @	.06 3/8 @	Gutta Percha			
No. 2 Brown, clean, thin	.13 1/2 @ .13 3/4	.05 3/4 @ .06	.06 1/2 @	Gutta Siak	.16 @	.11 @	.11 1/2 @
Brown, roll	.09 1/2 @ .09 3/4	.05 3/8 @ .05 3/4	.06 1/4 @	Gutta Soh	.28 @	.22 @	.21 @
East Indian				Red Macassar	2.25 @ 2.30	1.75 @	1.75 @
PONTIANAK				Balata			
Banjermasin	.08 @	.06 1/2 @	.06 @	Block, Ciudad Bolivar	.41 @ .42	.29 @	.27 @
Pressed block	.12 3/4 @ .13	.10 1/2 @	.10 @	Colombia	†.36 @	@	@
Sarawak	.08 @	.06 1/2 @	.06 @	Manaos block	.44 @ .45	.29 @	.28 @
South American				Surinam sheet	.60 @ .62	.55 @	.54 @
PARAS				Amber	.63 @ .63	.57 @	.56 @
Upriver, fine	.15 3/4 @	.08 3/4 @	.08 1/2 @				
Upriver, fine	*.19 1/4 @	*.11 @	*.11 1/2 @				
Upriver, coarse	.07 1/2 @	.05 1/2 @	.05 1/2 @				
Upriver, coarse	*.13 1/4 @	*.07 3/4 @	*.07 1/2 @				

*Washed and dried crepe. Shipment from Brazil.
†Nominal.

N. Y. Outside Market

The unprofitable prices have apparently had the desired effect at last. Production in the Far East on both large and small estates declined, as did dealers' stocks and supplies on the plantations.

Should this decrease continue, and the large stocks on hand be reduced, the rubber industry would see daylight. The trouble is, however, that news of this sort stimulates prices; and with higher prices, native producers would again be encouraged to produce.

But even this possibility may be ironed out if the restriction meetings between the Dutch growers and the Government produce an adequate plan.

The automobile industry hit the highest point this season in the first week of May, but declined again more than seasonally in the second week. The manufacturers who are advertising consistently and who offer the greatest values to the public seem to have no trouble selling their cars, but others are finding sales difficult just as they are in other industries.

Tire production is being maintained at a fair rate, though not at so high a rate as could be expected if the expected replacement demand were to make itself felt. Tire dealers, however, are keeping down their inventories.

The effect of the entrance of the oil companies and the mail order houses into the tire selling field is now being felt by the independent dealers. The number of independents is said to have declined from 100,000 in 1925-1926 to around 75,000 in 1930.

Based on the statistical position of rubber, prices should remain about the present levels or lower. But if a favorable restriction plan is formulated or if shipments drop off sharply, prices will probably respond with a better tone.

Week ended May 2. One unusual transaction brightened the market, but outside of that the market was unchanged so far as activity was concerned. The recession in the stock market and other commodity markets did not help the sentiment any; so rubber hit its record low again during the week, recovering later.

The unusual transaction reported by the *Journal of Commerce* was, "A long range transaction of more than ordinary interest which came to light yesterday with the information that standard European estate ribs, quantity unannounced, had been purchased for a buyer here for January-February-March, 1933, at 3 7/3d per pound. The transaction was closed on the basis of landed terms, London, and worked out at around 7.85 cents a pound in United States currency."

The firmer tone at the end of the week was due to the favorable shipment figures for Malaya. During April, shipments were 43,453 tons, compared with 48,500 tons in March. During April also shipments from Ceylon were 3,487 tons, compared with 6,213 tons in March.

Dealer interest was present in slight degree, but buyers were cautious. The gloom from the stock market was felt by the dealers. After stocks had dropped sharply on Thursday a substantial rally took place, with shorts running to cover.

This condition gave rise to the belief that the market had been oversold. On Saturday stocks broke again to rally later in the trading.

Several expressions of confidence in business have been made by prominent business men and the Department of Commerce, and the better production figures reported by the automobile industry seem to bear them out. It will probably take the cue from business rather than stocks for the ensuing months.

Prices at the close of May 2 were:

Spot	May 2	Month Ago	Year Ago
Crepe	6 1/4	7	14 1/2
Ribs	6	6 1/4	14 1/2
Upriver fine	8 1/4	9	15 1/4

Week ended May 9. Actuals were firm all week. Closing quotations were around 6 1/2 cents for the nearby positions. May and June standard ribs were the first to receive the attention of dealers, and later a sizable tonnage was sold in the July-August-September deliveries. The change for the week was an increase of approximately 3/8-cent.

One large tire company increased its daily production of tires substantially, went on a six-day week basis, and reported that the large number of orders will necessitate a six-day, 24-hour schedule in some divisions of its plant.

April automobile production showed a good gain of 20 per cent over March. The increase between these two months last year was only 12 per cent, but production in April of this year was 25 per cent below production in April last year. The March tire report was more favorable in its inventory totals than at any time since last September, but inventories of casings and of inner tubes showed gains over the previous month.

Two plantations suspended operations, according to information received from London; while another cable reported that a large British company is expecting to produce rubber at a cost of 6 cents a pound this year in contrast with an average f. o. b. cost in 1930 of almost 9 cents. Stocks in London and Liverpool were expected to increase 1,200 tons for the week.

Factory buying was in evidence to some degree during the week, but the tendency was to hold off for more advantageous prices. The policy of buyers for some time past has been to buy only on a scale downward, and the past week was no exception.

Prices at the close on May 9 were:

Spot	May 9	Month Ago	Year Ago
Crepe	6 1/2	7	14 1/2
Ribs	6 1/4	6 1/4	14 1/2
Upriver fine	8 1/2	9 1/2	15 1/4

Week ended May 16. Manufacturers during April took 33,321 long tons of rubber, the heaviest volume consumed during any month since June, 1930. March consumption was 32,788 tons, and in April, 1930, consumption was 40,207 tons.

The Department of Commerce published a report which showed that tire dealers were still improving their inventory position. Tire stocks in the hands of dealers on April 1, 1931, averaged 78.4 casings per dealer, compared with 83 tires per dealer on the same date a year ago.

Reports that the Dutch Government was sponsoring a meeting called for the pur-

pose of studying the rubber industry gave the market strength and influenced some buying. Spot rubber advanced to 6 5/8 bid, latex to 6 3/8 and 7 1/8, and upriver fine Paras to 8 1/4 bid.

A heavy tire volume was predicted by one large manufacturer; while another one showed a tremendous loss in the first quarter, because of inventory write-offs. Weak spots and unprofitable branches are being corrected so that the economies effected by manufacturers in operating costs should be reflected in their statements.

The stronger tone displayed in the market in the last week could be maintained if shipments from the Far East would drop off. The figures on dealers' stocks were interpreted in this light on Monday, and the best gains of the year were scored. May-June No. 1 ribs were offered at 1/4-cent up, and ordinary thick latex gained a half cent.

Prices at the close on May 16 were:

Spot	May 16	Month Ago	Year Ago
Crepe	6 7/8	6 5/8	14 1/2
Ribs	6 5/8	6 1/4	14 1/2
Upriver fine	8 1/2	8 3/4	15 1/4

Week ended May 23. Actuals hit 7 cents for a time in the strong upturn on Tuesday, but prices settled back to 6 7/8 cents, where they closed the week.

On Friday plantation ribbed smoke sheets were 6 5/8 bid, 6 3/4 asked; spot first latex, thick, 6 3/4 bid, 6 7/8 asked; upriver fine spot Paras, 8 3/8 bid, 8 5/8 asked.

The strong Tuesday market was a result of figures which showed that April production on both large and small estates in the Far East had declined. These figures led to the hope that the Malayan totals would reveal a similar trend.

Estimates put May consumption by American factories at between 37,000 and 38,000 tons, which would compare with a total of 33,321 tons in April and 39,902 tons in May last year.

If replacement demand has materialized, it is reasonable to expect also that we shall see a large consumption figure for this month. Shipments of tire casings in April were estimated at more than 20 per cent higher than in March, and higher than in the same month last year.

For the first time in a long period it is estimated that stocks in London and Liverpool will show a decline. The drop in stocks on Monday is put at 700 tons for the two centers.

Prices at the close on May 23 were:

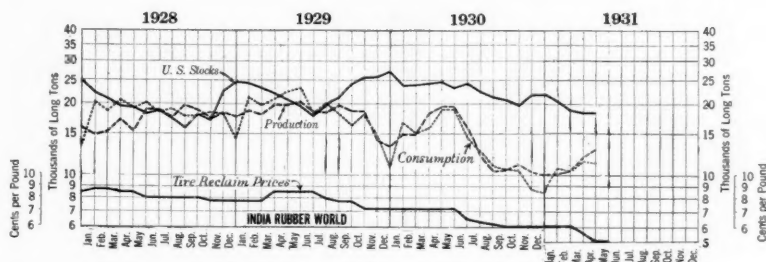
Spot	May 23	Month Ago	Year Ago
Crepe	7 1/8	6 5/8	14 1/2
Ribs	6 5/8	6	14 1/2
Upriver fine	8 5/8	8 3/4	15 1/4

On May 25 business in actuals was suspended for the day because of an outing planned by the members of the Rubber Trade Association. On May 26 ribbed smoked sheets were 6 5/8 cents unchanged from May 25.

Price Differentials

Price differentials on plantation rubber delivered on new "A" contracts during June, 1931, are: No. 2 crepe (thick or thin) at 10 points; No. 2 ribbed S. S. at 12 points; No. 3 ribbed S. S. at 28 points; No. 4 ribbed S. S. at 43 points; No. 5 ribbed S. S. at 68 points; limit of allowance on No. 2 crepe at 25 points; allowance on bales at 13 points.

Reclaimed Rubber



Production, Consumption, Stocks, and Prices of Tire Reclaim

THE average monthly production and consumption tonnage of reclaimed rubber during the first quarter were 11,423 tons and 11,442 tons, respectively. This is a remarkably close balancing of supply to demand.

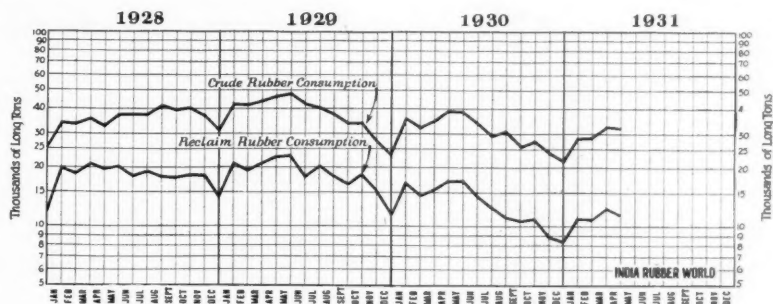
Stocks on hand were reduced during the quarter from 20,466 tons in January to 18,375 tons in March, at which amount they held closely in April. The stocks for that month are reported at 18,356 tons.

Production of reclaim in April was 13,267 tons, showing a gain over March production of 329 tons. This indicates that reclaimers are operating steadily at a fair rate of production which, if continued in the last three quarters of the year at the average output for the first quarter, will result in the production of 147,000 tons, or about 10,000 tons less than was produced in 1930.

The outlook at present, however, indicates a better performance than this since consumption is increasing slowly and steadily month by month.

The ratio of consumption of reclaim to crude decreased exactly 3 per cent in April below the corresponding ratio for March, presumably because of the continued decline in the price of crude.

Tire reclaim price quotation is unchanged at 5 cents a pound. Tires and other rubber goods stocks are being main-



Crude and Reclaimed Rubber Consumption

tained at reasonable levels to supply current needs; consequently, reclaimers benefit promptly by improvement in the demand for tires and other rubber goods.

Rubber reclaimers are very active in developing grades to meet 1931 conditions. Crude rubber and reclaim are both selling at the lowest prices in history and at figures below cost. Under these conditions the well-maintained high ratio of the consumption of reclaim to crude demonstrates that reclaim is not used as a substitute for crude but for the inherent compounding value it possesses for specific manufacturing needs and results.

The economy of materials is dependent

on their volume cost based on unit gravity. This is not a new idea and, although often stressed, is still not appreciated by compounders as it should be.

For example, in comparing the economy of two stocks on volume cost basis multiply the respective price of each by its respective gravity and the result is the volume cost. Thus a reclaim at 4 cents a pound with gravity 1.60 has a volume cost of 6.4 cents; while one at 5 cents a pound with gravity 1.20 has a volume cost of 6 cents. In other words, the 5-cent reclaim by reason of its lower gravity is 7 per cent more

economical in point of volume than the heavier gravity 4-cent reclaim.

From the production point of view the same weight of the lighter gravity reclaim in a given weight will yield a greater number of pieces of a given size than can be obtained from the same weight of the heavier gravity reclaim. In other words, the number of pieces produced from the same weights of stocks of different gravities is inversely proportional to their gravities.

In the current market for standard reclaims all grades remain unchanged as quoted one month ago, which are as follows:

New York Quotations

May 26, 1931

	Spec. Grav.	Price Per Pound
High Tensile		
Super-reclaim, black...	1.20	\$0.06¼ @ \$0.07
red	1.20	.06¼ @ .06¼

Auto Tire		
Black	1.21	.05 @ .05¼
Black selected tires...	1.18	.05¼ @ .05¼
Dark gray	1.35	.06¼ @ .06¼
White	1.40	.07¼ @ .07¼

Shoe		
Unwashed	1.60	.05¼ @ .06
Washed	1.50	.07¼ @ .07¼

Tube		
No. 1	1.00	.08 @ .08¼
No. 2	1.10	.06¼ @ .06¼

Truck Tire		
Truck tire, heavy gravity	1.55	.06 @ .06¼
Truck tire, light gravity	1.40	.06¼ @ .06¼

Miscellaneous		
Mechanical blends....	1.60	.04¼ @ .05

United States Reclaimed Rubber Statistics—Long Tons

Year	Production	Consumption	Consumption Per Cent to Crude	United States Stocks*	Exports
1925	132,930	137,105	35.6	13,203	4,571
1926	180,582	164,500	45.9	23,218	5,391
1927	189,144	178,471	47.6	24,980	8,540
1928	208,516	223,000	50.4	24,785	9,577
1929	219,057	224,253	47.9	27,464	12,721
1930	157,967	153,497	41.5	24,008	9,468
1930					
January	13,902	15,766	45.8	24,241	954
February	14,676	14,012	45.5	24,241	1,203
March	16,115	14,669	43.2	24,415	1,048
April	16,511	16,269	43.0	24,592	740
May	16,496	16,411	43.7	23,356	939
June	14,581	13,534	41.6	24,484	641
July	11,411	11,918	42.3	22,477	778
August	11,158	11,321	35.9	21,636	807
September	10,588	10,787	41.4	20,704	656
October	11,437	11,038	39.2	19,912	572
November	10,895	9,075	37.5	22,000	437
December	10,197	8,697	39.3	22,000	693
1931					
January	10,460	11,003	37.6	20,466	649
February	10,871	10,800	37.5	18,878	625
March	12,938	12,524	38.2	18,375	752
April	13,267	11,745	35.2	18,356	577

* Stocks on hand the last of the month or year.
Compiled by The Rubber Manufacturers Association, Inc.



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Compounding Ingredients

TIRE production seems not to have been increased greatly during the past month. The May demand for compounding ingredients was maintained at essentially the same level as for April. Orders for supplies are regarded as more for replacement of stocks rather than anticipating requirements considerably in advance. This tendency is indicated by the requests commonly made for immediate shipment.

ACCELERATORS. The month passed without announcement of any new accelerator. Tetra - methyl - thiuram - tetrasulphide (TMTT), the new sulphur bearing accelerator, announced last month has aroused considerable interest with compounders. It is typical of the enterprise with which chemical manufacturers are striving to benefit the rubber industry by their study of vulcanization problems.

AGE RESISTERS. The preservation of vulcanized rubber goods would seem to be

well assured by the list of materials designed to forestall rubber deterioration from the usual causes. There are very few uses for rubber in which age resisters will not well repay their cost.

A new antioxidant Age-Rite Gel was announced in May. It is intended as a general antioxidant and completes the desirable range of substances from which the compounder can choose for his particular line of work.

CARBON BLACK. Rubber consumption of carbon black in March is reported to have exceeded production for that month. The increased demand continued in May. Standard grade black at 3 cents a pound f.o.b. Texas is selling below cost.

CLAY. Compounding clay, like whiting, is steadily consumed in many lines of rubber manufacture but at prices that show no profit to the materials dealer.

LITHARGE. Announcement was made

about May 1 that the price would be protected until August 31. The following week prices on commercial litharge in casks was reduced ¼-cent a pound to 6½ cents, owing to the drop in price of the metal. The price on stock in kegs remained unchanged.

SOFTENERS. These materials find steady consuming demand. The call for Degras is fair with prices unchanged.

STEARIC ACID. This plasticizer and cure stabilizer is in steady request especially in ground form.

SOLVENTS. Both light and heavy grades were quoted at 5 cents a gallon for tank car lots the last week in April. Early in May the prices advanced to 5½ cents a gallon on the same basis.

ZINC OXIDE. Rubber manufacturers are ordering replacement stocks more frequently on the basis of their current needs. The price is unchanged.

New York Quotations

May 26, 1931

Prices Not Reported Will Be Supplied on Application

Abrasives			Trimene.....lb. @			PINK		
Marble flour.....ton	\$20.00	@ \$25.00	base.....lb.	@		Pink toners.....lb.	\$1.00	@ \$1.80
Pumice stone, pvd.....lb.	.02½	@ .04	Triphenyl guanidine.....lb.	\$0.58	@ \$0.60	PURPLE		
Rottenstone, domestic.....ton	23.50	@ 28.00	Tuads.....lb.	@		Permanent purple.....lb.	1.50	@ 2.00
Rottenstone, English.....lb.	.03¾	@	Uto.....lb.	3.00	@	Purple toners.....lb.	.60	@ 1.90
Silica.....lb.	.01¼	@ .05	Ureka.....lb.	.70	@ 1.00	RED		
Accelerators, Inorganic			ZBX.....lb.	.50	@ .60	Antimony		
Lead, carbonate.....lb.	.07¾	@	Zimate.....lb.	@		Crimson, R. M. P.No. 3 lb.	.48	@
red.....lb.	.07¾	@	Acids			Sulphur free.....lb.	.52	@
sublimed blue.....lb.	.06¾	@	Acetic 28% (bbls.).....100 lbs.	2.60	@ 2.85	7-A.....lb.	.35	@
sublimed white.....lb.	.06¾	@	glacial (carboys).....100 lbs.	9.73	@ 9.98	Z-2.....lb.	.22	@
super-sublimed white.....lb.	.06¾	@	Sulphuric, 66%.....ton	15.50	@	Cadmium.....lb.		
Lime flour, hydrated.....ton	20.00	@ 35.00	Age Resisters			Chinese red.....lb.	.90	@
Litharge, casks.....lb.	.06¾	@	Age-Rite Gel.....lb.	@		Crimson red.....lb.	.90	@
Magnesia, calcined, heavy.....lb.	.04	@	powder.....lb.	@		Iron Oxides		
carbonate.....lb.	.06	@ .07	resin.....lb.	@		bright pure domestic.....lb.	.09½	@ .12
Orange mineral A.A.A.....lb.	.09¼	@	white.....lb.	@		bright pure English.....lb.	.11	@
Accelerators, Organic			Albasan.....lb.	@		bright reduced English.....lb.	.08	@
A-1.....lb.	.22	@ .27	Antox.....lb.	@		bright reduced domestic.....lb.	.04	@ .08
A-5-10.....lb.	.31	@ .36	Oxynone.....lb.	.68	@ .90	Indian (maroon), pure		
A-7.....lb.	.35	@ .65	Resistox.....lb.	.54	@ .65	domestic.....lb.	.09½	@
A-11.....lb.	.62	@ .75	Stabilite.....lb.	.57	@ .59	Indian (maroon), pure		
A-16.....lb.	.57	@ .65	Alba.....lb.	.70	@ .75	English.....lb.	.09½	@
A-19.....lb.	.58	@ .75	VGB.....lb.	@		Indian (maroon), reduced		
A-32.....lb.	.70	@ .75	Zalba.....lb.	@		English.....lb.	.08	@
Accelerator 49.....lb.	@		Alkalies			Indian (maroon), reduced		
Aldehyde ammonia.....lb.	.65	@ .70	Caustic soda, 76%			domestic.....lb.	.03	@ .07½
Altax.....lb.	@		solid.....100 lbs.	2.50	@	Mapico.....lb.	.09	@
Barak.....lb.	@		Antisun Materials			Medium red.....lb.	.90	@
BLE.....lb.	@		Heliozone.....lb.	@		Oximony.....lb.		
Butene.....lb.	@		Sunproof.....lb.	@		Red toners.....lb.	.95	@ 2.75
Captax.....lb.	@		Binders, Fibrous			Rub-er-red.....lb.	.08¾	@
Crylene.....lb.	@		Cotton flock, dark.....lb.	.09	@ .10	Scarlet red.....lb.	1.35	@
paste.....lb.	@		died.....lb.	.50	@ .85	Spanish red oxide.....lb.	.02½	@ .04
DBA.....lb.	@		white.....lb.	.11	@ .20	Sunburnt red.....lb.	.14	@
Di-esterex N.....lb.	@		Colors			Venetian red.....lb.	.01½	@
Di-ethyl-amine, 100%.....lb.	@		BLACK			WHITE		
DOTG.....lb.	.42	@ .44½	Bone.....lb.	.07½	@	Lithopone.....lb.	.04¾	@ .05
DPG.....lb.	.30	@ .32½	Carbon (see Reenforcers)			Albalith.....lb.	.04½	@ .05
Ethylidene aniline.....lb.	.45	@ .47½	Drop (bbls.).....lb.	.05½	@ .15	Azolith.....lb.	.04½	@ .05
Formaldehyde aniline.....lb.	.37½	@ .40	Lampblack (commercial).....lb.	.07	@ .08	Cryptone.....lb.	.06½	@ .07
Grassclerator 808.....lb.	@		BLUE			Grasselli (50 lb. bags).....lb.	.04½	@ .04¾
833.....lb.	@		Blue toners.....lb.	.60	@ 3.85	(400 lb. bbls.).....lb.	.04¾	@ .05
Heptene.....lb.	@		Brilliant blue.....lb.	2.00	@ 3.50	Titanium oxide, pure.....lb.	.20	@
base.....lb.	@		Prussian.....lb.	.35	@ .37	Titanox "B".....lb.	.06½	@ .07
Hexamethylenetetramine.....lb.	.58½	@ .61	Ultramarine.....lb.	.06	@ .30	"C".....lb.	.07	@ .07½
Hydrone.....lb.	@		BROWN			Zinc Oxide		
Lead oleate, No. 999.....lb.	.13	@	Iron oxide.....lb.	@		AAA (lead free).....lb.	.06½	@ .07
Witco.....lb.	.15	@	Mapico.....lb.	.17	@	Azo (factory):		
Lkhex.....lb.	@		Sienna, Italian, raw.....lb.	.04½	@ .11	ZZZ (lead free).....lb.	.06½	@ .07
Monex.....lb.	@		GREEN			ZZ (lead).....lb.	.06½	@ .06¾
Novex.....lb.	@		Brilliant green.....lb.	3.65	@	Z (8% lead).....lb.	.06½	@ .06¾
Phenex.....lb.	.65	@ .70	Chrome, light.....lb.	.23	@ .25½	Green seal.....lb.	.10¾	@ .10¾
Pipsol.....lb.	4.00	@ 4.50	medium.....lb.	.26	@ .27½	Green seal, Anaconda.....lb.	.10¾	@ .10¾
Plastone.....lb.	@		Chromium oxide.....lb.	.25	@ .32	Kadox, black label.....lb.	.10¾	@ .10¾
R-2.....lb.	1.75	@ 2.15	Dark green.....lb.	1.30	@	blue label.....lb.	.09¾	@ .09¾
base.....lb.	4.50	@ 5.00	Green toners.....lb.	1.00	@ 3.60	red label.....lb.	.08	@ .08½
R & H 40.....lb.	.40	@ .42½	Light green.....lb.	.70	@	Red seal.....lb.	.09¾	@ .09¾
50.....lb.	.40	@ .42½	ORANGE			Red seal, Anaconda.....lb.	.09¾	@ .09¾
397.....lb.	.75	@ .77½	Cadmium sulphide.....lb.	.65	@ .75	Special.....lb.	.07	@ .07½
Retardex.....lb.	.50	@	Orange lake.....lb.	.50	@ .75	White seal (bbls.).....lb.	.11¾	@ .11¾
Safex.....lb.	@		Orange toners.....lb.	1.60	@	White seal, Anaconda.....lb.	.11¾	@ .11¾
SPDX.....lb.	.70	@ .75	ORCHID			XX green.....lb.	.07	@ .07½
Super-sulphur No. 1.....lb.	@		Orchid toners.....lb.	1.05	@ 1.75	XX red.....lb.	.06½	@ .07
No. 2.....lb.	@					Zinc sulphide (bbls.).....lb.	.15	@ .15½
Tensilac 39.....lb.	.40	@ .42½				YELLOW		
Thermio F.....lb.	@					Cadmium sulphide.....lb.	.80	@ .90
Thiocarbamilid.....lb.	.21	@ .23				Chrome.....lb.	.16½	@
TMTT.....lb.	3.00	@ 3.25				Lemon yellow.....lb.	1.50	@
						Mapico.....lb.	.12	@

New York Quotations

May 26, 1931

Prices Not Reported Will Be Supplied on Application

Colors (Continued)

YELLOW (Continued)

Ochre, domestic.....lb.	\$0.01½ @ \$0.02½
French.....lb.	.03 @
Oxide, pure.....lb.	.09 @
Yellow toner.....lb.	1.75 @
Zinc, C. P., imported.....lb.	.21 @

Deodorant

Rodo.....lb.	@
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Factice—See Rubber Substitutes

Fillers, Inert

Asbestine.....ton	13.40 @ 13.50
Louis white (f.o.b. St. Louis, bbls.).....ton	23.00 @
paper bags).....ton	22.20 @
Barytes, white, spot.....ton	32.50 @
off color, spot.....ton	25.00 @
Foam "A" (f.o.b. St. Louis).....ton	23.00 @
Basofor.....lb.	@
Blanc fixe, dry.....lb.	.04½ @
pulp.....ton	42.50 @ 45.00
C-C-O white (f.o.b. St. Louis, bbls.).....ton	15.00 @
Infusorial earth.....ton	45.00 @ 50.00
Slate flour, gray (fact'y).....ton	6.00 @
Suprex white, extra light.....ton	70.00 @ 80.00
Whiting.....lb.	@
Chalk, imported.....100 lbs.	.95 @ 1.50
Domestic.....100 lbs.	1.00 @
Paris white, English cliffstone.....100 lbs.	1.50 @
Quaker.....ton	@
Sussex.....ton	@
Witeco (l. c. l.).....ton	20.00 @
Wood flour.....ton	25.00 @

Fillers for Pliability

Flex.....lb.	@
Fumonex.....lb.	.03½ @ .07
P-33.....lb.	@
Thermax.....lb.	@
Velvetex.....lb.	.03 @ .06

Finishes

Mica, amber.....lb.	.04 @ .05
Shellac, fine orange.....lb.	.60 @
Starch, corn, pwd.....100 lbs.	2.57 @ 2.77
potato.....lb.	.05½ @ .06½
Talc, domestic.....lb.	.01¼ @
dusting.....lb.	.02 @
French.....ton	18.00 @ 22.00
Italian.....lb.	.02¼ @
Pyrex A.....ton	@

Inflating Material

Ammonium carb., pwd.....lb.	.10 @ .11
lump.....lb.	.09½ @ .10½
Sponge paste.....lb.	.30 @

Mineral Rubber

Fluxrite (solid).....lb.	@ 42.00
Genasco (fact'y).....ton	40.00 @ 39.65
Gilsonite (fact'y).....ton	37.14 @
Granulated M. R.....ton	@
Hydrocarbon, hard.....ton	@
Ohmic Kapak, M. R. (f.o.b. fact'y).....ton	60.00 @
M. 4 (f.o.b. fact'y).....ton	175.00 @
Paradura (fact'y).....ton	62.50 @ 65.00
Parrr Grade 1.....ton	23.00 @ 28.00
Grade 2.....ton	23.00 @ 28.00
Pioneer, M. R., solid (fact'y).....ton	40.00 @ 42.00
M. R. granulated.....ton	50.00 @ 52.00

Robertson, M. R., solid

(fact'y).....ton	\$32.00 @ \$80.00
M. R. granulated.....ton	35.00 @ 80.00

Mold Lubricants

Rusco mold paste.....lb.	.12 @ .30
Sericite.....lb.	@
Soapbark (cut).....lb.	.07½ @ .08
Soapstone.....ton	15.60 @ 22.00

Oils

Castor, blown, drums.....lb.	.13¼ @ .14
Kerosene.....gal.	.10 @
Mineral.....gal.	.20 @
Poppy seed.....gal.	1.70 @
Rapeseed, blown.....gal.	.70 @ .72
Red oil, distilled.....lb.	.68½ @ .08½
Rubber process.....gal.	.25 @
Spindle.....gal.	.30 @

Protective Colloids

Bentonite (di-persion clay).....lb.	.02½ @
Casein, domestic.....lb.	.07 @ .07½

Reinforcers

Aluminum flake (sacks, c. l.).....ton	21.85 @
(sacks, l.c.l.).....ton	24.50 @
Carbon Black.....lb.	@
Aerifluted arrow.....lb.	.03½ @ .07
Cabot's certified black.....lb.	.03 @
Century (works, La., c. l.).....100 lbs.	3.50 @
Disperso (works, La., c. l.).....100 lbs.	3.50 @
Excello.....lb.	.03 @
Gastex (f. o. b. fact'y) contracts.....lb.	.02½ @
carload.....lb.	.02½ @ .03
less carload.....lb.	.03½ @ .04½
Micronex.....lb.	.04 @ .10
Ordinary (compressed or uncompressed).....lb.	.03½ @ .07
Palmer gas black.....lb.	.03 @
Supreme.....lb.	.03 @

Clays

Bento.....lb.	.03 @
Blue Ridge, dark.....ton	@
China.....lb.	.01¼ @
Dixie.....ton	@
Dusto.....lb.	.08 @
Langford.....ton	@
Lexo (works).....ton	8.00 @
Par.....ton	@
Perfection.....ton	20.00 @
Suprex No. 1.....ton	8.00 @
No. 2, dark.....ton	6.50 @
Glue, high grade.....lb.	.27 @ .35

Rubber Substitutes or Factice

Amberex.....lb.	.15 @
Black.....lb.	.07 @ .11
Brown.....lb.	.07 @ .12
Thiokol.....lb.	.30 @
White.....lb.	.08 @ .15

Softeners

Burgundy pitch.....100 lbs.	6.00 @
Atlas.....100 lbs.	6.50 @
Corn oil, crude.....lb.	.07½ @ .08
Cottonseed oil (P. S. Y.).....lb.	@
Cyclone oil.....lb.	.25 @ .34
Degras.....lb.	.04 @ .04½
Fluxol.....ton	18.00 @ 80.00
Fluxrite (fluid).....lb.	@
Palm oil (Lagos).....lb.	.04¼ @
(Niger).....lb.	.04¼ @ .04½
(Witco).....lb.	.05¼ @
Para-flux.....gal.	.15 @
Petrolatum, snow white.....lb.	.08 @ .08½
Pigmentar.....gal.	.18 @ .23

Pigmentar oil (tank cars,

factory).....gal.	\$0.18 @
(bbls., drums).....gal.	.23 @
Pine oil, dest distilled.....gal.	.54 @ .55
Pine pitch.....bbl.	6.50 @ 7.00
Pine tar (retort).....gal.	.23 @ .25
Rosin K (280 lbs.).....bbl.	6.35 @
Rosin oil, compounded.....gal.	.35 @
No. 3, deodorized.....gal.	.57 @
No. 556, deodorized.....gal.	.48 @
Rubberseed, drums.....lb.	.09 @ .09½
Rubtack.....lb.	.08 @
Tackol.....lb.	.09 @ .18
Tonox.....lb.	@
Witco No. 20.....gal.	.08 @
Woburn oil.....lb.	.05½ @
Wobonite No. 94.....lb.	.03½ @

Solvents

Benzol (90% drums).....gal.	.25 @
Carbon bisulphide (drums).....lb.	.05½ @ .12
tetrachloride (drums).....lb.	.06½ @ .07
Dip-Sol.....gal.	@
Dryolene, No. 9.....gal.	@
Gasoline.....lb.	@
No. 303.....gal.	.20 @
Drums, (c. l.).....gal.	.16 @
Tank cars.....gal.	@
Petrolbenzol.....gal.	@
Rub-Sol.....gal.	@
Solvent naphtha (tanks).....gal.	.25 @
Stod-Sol.....gal.	@
Troluol.....gal.	@
Turpentine, Venice.....lb.	.20 @
dest distilled.....gal.	.40 @ .44

Stabilizers

Laurex, ton lots.....lb.	@
Sta-Tex A.....lb.	@
Stearates.....lb.	@
Aluminum.....lb.	.26 @ .27
Calcium.....lb.	.26 @ .27
Magnesium.....lb.	.28 @ .29
Zinc.....lb.	.27 @ .28
Stearex-B.....lb.	.08½ @ .12
Stearex flake.....lb.	.09 @ .11
Stearic acid, dbl. pres'd.....lb.	.09 @ .09½

Vulcanizing Ingredients

Sulphur.....lb.	@
Rubber sulphur.....100 lbs.	@
Soft rubber (c.l.).....100 lbs.	@
(l.c.l.).....100 lbs.	@
Sulphur chloride.....lb.	.03¼ @ .04
Superfine commercial flour (bbls.).....100 lbs.	2.55 @ 3.10
(bags).....100 lbs.	2.20 @ 2.80
Tire brand, superfine.....100 lbs.	1.75 @
Tube brand, velvet.....100 lbs.	2.30 @
Velvet flour (240 lb. bbls.).....100 lbs.	2.95 @ 3.50
(150 lb. bags).....100 lbs.	2.60 @ 3.15
Telloy.....lb.	@
Vandex.....lb.	@
(See also Colors—Antimony)	

Waxes

Beeswax, white, com.....lb.	.55 @
carnauba.....lb.	.33 @
ceresin, white.....lb.	.12½ @
montan.....lb.	.06½ @
ozokerite, black.....lb.	.28 @
green.....lb.	.28 @
Paraffin.....lb.	@
122/124, crude, white scale.....lb.	.03¼ @
124/126 crude, white scale.....lb.	.03¼ @
125/127 fully refined.....lb.	.04¼ @

Netherlands East Indies Exports

Crude Rubber Exports During 1929 and 1930 by Months

	Long Tons							
	Java and Madura		Sumatra East Coast		Other Netherlands East Indies		Total	
	1929	1930	1929	1930	1929	1930	1929	1930
January.....	5,640	5,709	8,067	7,831	11,535	8,928	25,242	22,468
February.....	6,572	6,900	7,510	7,191	10,531	11,414	24,613	25,505
March.....	5,515	5,796	6,620	6,612	10,698	11,214	22,833	23,622
April.....	5,997	4,802	6,645	6,326	11,280	12,724	23,922	23,852
May.....	6,263	6,352	6,961	6,661	13,438	12,041	26,662	25,054
June.....	5,582	4,728	6,693	4,776	11,270	9,512	23,545	19,016
July.....	6,423	6,022	7,193	5,891	13,995	9,770	27,611	21,683
August.....	4,664	5,982	7,299	7,197	10,843	9,520	22,806	22,699
September.....	4,708	5,960	7,517	6,358	10,149	7,302	22,374	19,620
October.....	4,607	5,916	8,295	6,954	10,511	6,352	23,503	19,224
November.....	4,760	5,334	6,711	6,401	9,379	8,001	20,850	19,736
December.....	5,189	6,254	8,078	7,196	11,103	8,476	24,370	21,926
Totals.....	66,010	69,755	87,589	79,396	134,732	115,254	288,331	264,405

Compiled by Rubber Division, Department of Commerce, Washington, D. C.

Cotton and Fabrics

THE movement of the cotton market has been mostly in response to fluctuations on the stock market. Since prices there have been falling, cotton prices have dropped to record lows for the season.

Cotton statistics, both unfavorable and favorable, have been overlooked while the market followed stock quotations. The only other influence that seemed able to claim the attention of cotton traders was the weather reports.

Since the weather has been seasonal on the whole, the reports have only added to the heavy tone of the market. The crop has now advanced to the point where the weather will be the major influence, and in the next few weeks it should replace the action of the stock market as a market factor.

The report of the Cotton Textile Institute was disappointing. But April consumption showed an improvement over March, and cotton spindles active during the month operated at a higher rate than in the previous month.

The first week in June has been set aside as a National Cotton Week. The movement has been endorsed by the Departments of Commerce and of Agriculture, and by manufacturers and dealers all over the country.

Advertising and publicity programs will be instituted by these manufacturers and all who are interested in cotton in an effort to turn the public preference toward this fabric. Success has already been achieved to some degree since the style trend is leaning more and more toward cotton.

The dominance of the stock market tends to obscure the signs of improvement on the business horizon; and should the weather be such as to cut down the prospective output, the fact that sales and shipments have exceeded production may receive the notice it deserves.

Week ended May 2. Heavy liquidation for almost the entire week sent cotton prices back below the season's lows. Bullish weather news was ignored as was the news from the cotton manufacturing industries.

The weakness was ascribed in large part to the steady decline in stocks. When stocks had their sharp break on Friday, following the publication of the report for U. S. Steel, cotton prices receded from 26 to 30 points. Further weakness in stocks on Saturday was responsible for more liquidation, with losses of from 15 to 20 points. For the week, prices were approximately 75 points lower than at the close of the previous week.

Uncertainty as to the action of the Farm Board augmented the liquidation. The Board had sold wheat heavily, and traders were under the impression that it had also been selling cotton. Still these were only unconfirmed rumors.

The low temperatures in the western and central belt were said to have retarded and destroyed cotton. Cotton planting is estimated to be one to two weeks late in the southern half of the central and western belts. Reports have also been received to the effect that weevil emergence is much heavier now than it was last year.

COTTON BEAR POINTS

1. The weather has been seasonal, and the crop is well along.
2. Acreage reduction will average around 10 per cent.
3. Total stocks in the United States on May 1 were put at 8,536,000 bales, compared with 6,178,000 a year ago, and 4,804,000 two years ago.
4. Shipments of standard cotton cloths for April were 96.3 per cent of production; sales were 61 per cent of production; stocks on hand increased 3 per cent; and unfilled orders decreased 21.3 per cent.
5. Consumption for the first nine months to April 30 was 3,899,272 bales, compared with 4,848,298 in the same period last year.

COTTON BULL POINTS

1. The cotton spinning industry operated during April at 94.3 per cent capacity, on a single shift basis, compared with 91.2 per cent in March and 96.3 per cent in April last year.
2. The Farm Board has stated that the 1929 and 1930 crop cotton held by the American Cotton Cooperative Association has been financed for three years and will not be disposed of until it brings sufficient to repay the loans.
3. April consumption was 508,744 bales, compared with 490,586 bales in March, and 531,911 bales in April, 1930.
4. Sales and shipments of cotton goods since the first of the year are about 9 per cent in excess of production.
5. National Cotton Week, the first week in June, is intended to stimulate consumption.
6. Fertilizer sales have been 25 to 30 per cent less than a year ago.

The *Times'* index of cotton cloth production continued to improve. For the week ended April 25 the index was at 93.8, the highest point reached since the week ended May 3, 1930. It compares with the adjusted figure of 91.2 for the preceding week, and with 102.3 for the corresponding week last year.

Sales are not holding up so well, partly because of falling off in seasonal demands and partly because of the recession in stock prices which have driven cotton quotations to low levels. Manufacturers, however, are watching the balance between these two figures so that their statistical position is still strong.

Prices at the close of May 2 were:

Position	High	Low	Close	Previous Close
May	9.50	9.38	9.38	9.50/51
July	9.72	9.59	9.64	9.73/75
Oct.	10.05	9.93	9.99/10.01	10.05/06
Dec.	10.28	10.16	10.21/22	10.27/30
Jan.	10.43	10.29	10.34/35	10.40/41
Mar.	10.63	10.50	10.54	10.63/64

Week ended May 9. The course of the market on Monday morning indicated that it had become oversold in the previous week. Prices on Monday gained \$1.50 a bale. The next day quotations lost part of the gain, but for the next three days the market was stronger, only to weaken on Saturday.

The firmer tone in the stock market had much to do with the improvement in prices. Another factor was the low fertilizer sales reported.

The textile trade did not display its usual tone of optimism in the last week. Sales were small, and inquiry was light. The *Times'* index of cotton cloth production declined slightly for the week of May 2 to 93.5, as compared with a rate of 93.8 for the week ended April 25, and 105.7 for the week ended May 3, 1930. The fluctuations in the cotton market have not helped the

spinners any, either. They look for a steady market.

The crop report of the Weather Bureau of the United States Department of Agriculture read as follows when it was issued on Wednesday: "In general, the week was too cool for cotton. Planting advanced fairly well from the Mississippi Valley eastward, but germination has been slow, with considerable complaints of seed not sprouting well, especially in Georgia. Some fields have been planted to the northeastern portion of the belt, while chopping has begun as far north as the coastal plains of South Carolina.

"In Texas early cotton is in rather poor condition. In Oklahoma seeding has been retarded and germination is slow and mostly poor because of the cold, wet soil. In the far southwest the crop is doing well."

Prices at the close of May 9 were:

Position	High	Low	Close	Previous Close
May	9.98	9.85	9.91	9.90/91
July	10.19	10.07	10.12/13	10.10/12
Oct.	10.56	10.43	10.47/48	10.46/48
Dec.	10.79	10.65	10.70/72	10.68/69
Jan.	10.90	10.79	10.82/84	10.81
Mar.	11.07	10.95	11.01	10.99

Week ended May 16. The favorable weather reports received almost every day in the past week were responsible for the declining market. On Friday prices hit the season's lows in spite of the fact that spinners' takings for the week were the most favorable of the year, and that the visible supply of cotton registered a sharp decline. The stock market was weak; the weather in the cotton belt was fine, so the market was forced from 9 to 14 points lower. On Saturday it dropped a few more points.

The standard cotton cloth figures for April, published on Monday, gave the market a wrong start. The statistics disclosed that shipments in April were 96.3 per cent of production; sales were 61 per cent of production; stocks on hand increased 3 per cent, and unfilled orders decreased 21.3 per cent.

But the figures on cotton consumption for April were taken to indicate a general improvement in all branches of business. The United States Census Bureau reported that consumption of cotton in April was 508,744 bales, compared with 490,586 bales in March, 1931, and with 531,911 bales in April, 1930. These were the largest takings by domestic mills in twelve months.

For the nine months of the season, however, consumption was 3,899,272 bales, against 4,848,298 bales last year. The number of cotton spindles active in April was put at 26,645,404, against 26,489,832 in March, and 28,851,122 in April, 1930.

Exports for the nine months ended with April were 5,905,654 bales, against 6,120,526 bales last year, a decline of only 215,000 bales. The decline was more than offset by a drop of 243,000 bales in imports. A year ago they were 311,067 bales, this year 68,900 bales.

Prices at the close of May 16 were:

Position	High	Low	Close	Previous Close
May	9.37	9.25	9.26	9.39
July	9.55	9.43	9.44/45	9.55
Oct.	9.91	9.80	9.80/81	9.91/92
Dec.	10.13	10.01	10.02/03	10.13/14
Jan.	10.23	10.12	10.12	10.25
Mar.	10.42	10.30	10.30	10.42/44

Week ended May 23. The break below par of United States Steel and the generally weak tone in the stock market had a depressing influence on the cotton market. Cotton prices seemed to follow quotations on the Stock Exchange, with the result that at the close, prices were off about 20 points from the previous week.

On Tuesday cotton went to the lowest levels since 1915, when May hit a low of 8.93 cents, and all the future months sold below 10 cents. This was also a day of sharp losses on the Stock Exchange. Besides weakness in the foreign markets, owing to the suspension of a spinning firm in Alsace, helped push prices down.

The weather news was bearish for the most part. Cold temperatures and heavy rains did steady the market on Wednesday, but not for long. Predictions of good weather for the week-end softened the market on Saturday, brought out liquidation from the South and from abroad, and sent prices from 12 to 15 points lower.

The Census Bureau on Thursday reported that the cotton spinning industry operated during April at 94.3 per cent capacity on a single shift basis, compared with 91.2 per cent capacity in March this year and 96.3 per cent in April last year.

Active spindle hours for April averaged 216 per spindle in place, compared with 211 for March this year, and with 219 for April last year.

Liverpool will be closed until Tuesday on account of the Whitsuntide holiday.

Prices at the close of May 23 were:

Position	High	Low	Close	Previous Close
July	9.17	8.96	8.99/9.01	9.22/24
Oct.	9.53	9.33	9.35	9.58/59
Dec.	9.73	9.54	9.55/57	9.79/80
Jan.	9.85	9.68	9.68	9.92
Mar.	10.03	9.87	9.87/88	10.10

On May 25 the market was barely steady at a decline of 25 to 27 points. July sold 8.89 (high) at opening and 8.73 (low) at closing. Market conditions on May 26 were practically unchanged from those on the day previous.

WEEKLY AVERAGE PRICES OF MIDDLING COTTON

Week Ended	Cents per Pound
May 2	9.73
May 9	9.84
May 16	9.67
May 23	9.18

Cotton Fabrics

DUCKS, DRILLS, AND OSNABURGS. The market seems to be evincing increasing interest in textile supplies, but at prices considerably below those prevailing prior to May. Probably in the next sixty days prices will have discounted all of the adverse conditions and by the end of that period initiated a slow advance.

RAINCOAT FABRICS. Spring trade in rubberized raincoats has begun in a small way because of the recent period of rainy weather.

SHEETINGS. The market for the past two months was very quiet and unresponsive, with prices tending lower. It is believed that prices will not further decline. After an active first quarter it is customary for a quiet period to follow while the goods are being utilized for industrial purposes.

TIRE FABRICS. Steadily throughout May interest in tire fabrics was very slight. The market was therefore quiet, prices nominal and unchanged. Only small orders were placed.

How Hedging Serves the Industry

The Rubber Exchange membership and its history since 1926 are a refutation of the oft-repeated assertion that futures trading encourages speculation of the chance-taking kind rather than legitimate trade. That speculation exists in the rubber market as well as in other commodities and financial markets is readily admitted. It has been said that a futures market does not create speculation—that it is an inherent part of business activity. What futures

exchanges really accomplish is to harness speculation and make it available for the safer conduct of enterprises.

Banks look with favor upon those merchants and manufacturers whose commitments are hedged in futures contract market, and their financial credit is stronger and their borrowing capacity increased thereby.

Withdrawal of the British restriction plan for rubber in 1928 naturally involved a quick adjustment of the market to levels dictated by the stern laws of supply and demand rather than to artificial legislative control. That year witnessed a high of 41¼ cents per pound for rubber in the New York spot market, and a low of 16¾ cents. Contrast these differences in price with the extremes of the year following, 26¾ cents and 15½ cents, or with those of 1930, 16½ cents and 7¾ cents.

One of the most unstable and unsatisfactory crude markets on record for the American manufacturer took place during the year 1925, prior to the establishment of the Exchange and when the market was under legislative "control". The spot price soared to \$1.23 per pound, against its low of 34¼ cents for that year, a fluctuation of 88¾ cents per pound.

When The Rubber Exchange opened in February, 1926, March, which was the first delivery month, sold at 63.5 cents and at the close of that year the Clearing House settlement price for December was 38.3 cents. Below is a table showing the high and low prices and the Clearing House settlement price at the end of December during the years the Exchange has been in operation.

Year	High	Low	December 31
1926	63.6	35.5	38.3
1927	43.5	32.8	41.1
1928	42.9	16.5	17.8
1929	28.2	15.1	16.0
1930	18.6	7.2	8.4

During these years the Exchange afforded the trade an opportunity to protect itself against wide fluctuations and at times rapid declines.

New York Quotations

May 26, 1931

Drills

38-inch 2.00-yard	yard	\$0.11¼ @
40-inch 3.47-yard		.06¼ @
50-inch 1.52-yard		.14¼ @
52-inch 1.90-yard		.11¼ @
52-inch 2.20-yard		.10¼ @
52-inch 1.85-yard		.11¼ @

Ducks

38-inch 2.00-yd. D. F.	yard	.11 @
40-inch 1.45-yard S. F.		.15¼ @
72-inch 1.05-yard D. F.		.22¼ @
72-inch 1.66-ounce		.25 @
72-inch 17.21-ounce		.25¼ @

MECHANICAL

Hose and belting	pound	.22¼ @
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TENNIS

52-inch 1.35-yard	yard	.16¼ @
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Hollands

RED SEAL

36-inch	yard	.12¼ @
40-inch		.13¼ @
50-inch		.19¼ @

COLD SEAL

40-inch, No. 72	yard	.16¼ @
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Osnaburgs

40-inch 2.35-yard	yard	\$0.09¼ @
40-inch 2.48-yard		.08¾ @
40-inch 3.00-yard		.07¾ @
40-inch 10-oz. part waste		.10¼ @
40-inch 7-oz. part waste		.07¼ @
37-inch 2.42-yard		.09¼ @

Raincoat Fabrics

COTTON

Bombazine 64 x 60	yard	.09¼ @
Bombazine 60 x 48		.08¾ @
Plaids 60 x 48		.11 @
Plaids 48 x 48		.10¼ @
Surface prints 64 x 60		.12 @
Surface prints 60 x 48		.11 @
Print cloth, 38½-in., 60 x 48		.04¼ @
Print cloth, 38½-in., 64 x 60		.05 @

Sheetings, 40-inch

48 x 48, 2.50-yard	yard	.07 @
48 x 48, 2.85-yard		.06 @
64 x 68, 3.15-yard		.07¾ @
56 x 60, 3.60-yard		.06¼ @
44 x 48, 3.75-yard		.05 @
44 x 40, 4.25-yard		.04¼ @

Sheetings, 36-inch

48 x 48, 5.00-yard	yard	.04¼ @
44 x 40, 6.15-yard		.03¾ @

Tire Fabrics

SQUARE WOVEN 1¼"-ounce

Peeler, karded	pound	\$0.31 @
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BUILDER 23/11

Peeler, karded	pound	.31 @
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BUILDER 10/5

Peeler, karded	pound	.25 @
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CORD 23/5/3

Peeler, karded	pound	.31 @
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CORD 23/4/3

Peeler, karded	pound	.33 @
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CORD 23/3/3

Peeler, karded	pound	.36 @
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CORD 15/3/5

Peeler, karded	pound	.29 @
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CORD 13/3/3

Peeler, karded	pound	.28 @
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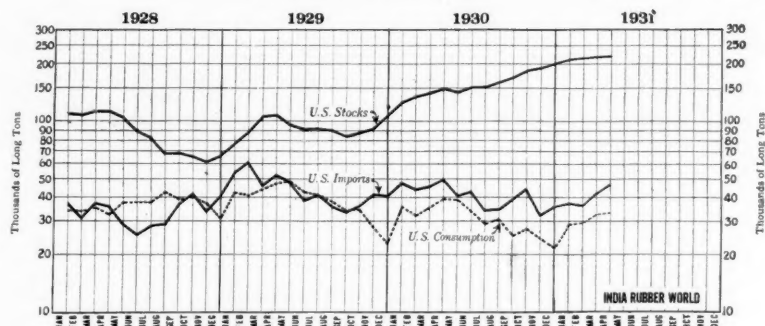
LENO BREAKER

8-oz. Peeler, karded	pound	.31 @
10-oz. Peeler, karded		.31 @

CHAFER

9.5-oz. Peeler, karded	pound	.33 @
12-oz. Peeler, karded		.34 @
14-oz. Peeler, karded		.33 @

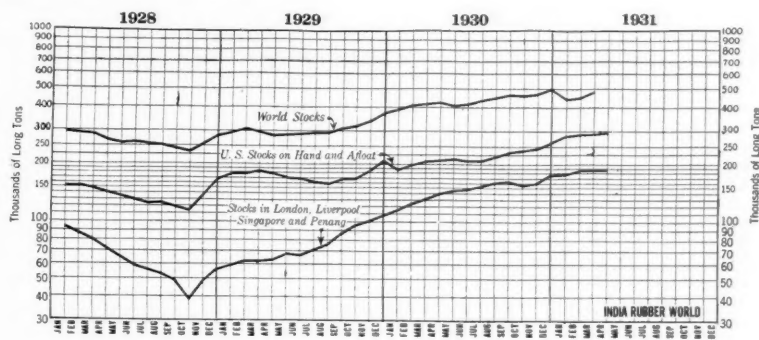
Imports, Consumption, and Stocks



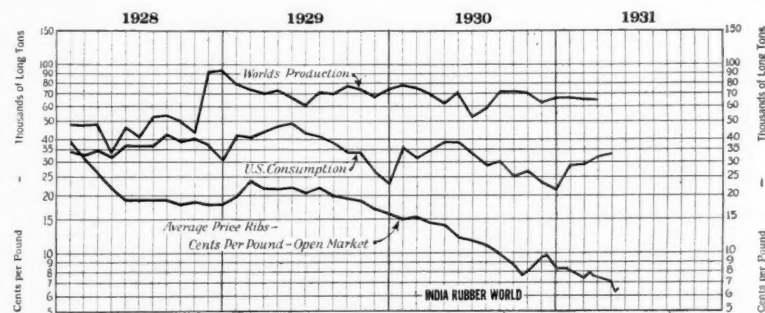
United States Stocks, Imports, and Consumption

TIRES, the largest rubber goods production division of the rubber manufacturing industry, have not shown the expected spring increase in volume. Many of the smaller units are in full production while the large plants are working at a rate considerably under their normal capacity. The smaller companies are said to be operating on 6-cent crude rubber while the large ones are on 10-cent rubber. This situation results from the fact that the big concerns must buy their supply of rubber six months ahead while the smaller companies are able to fill their rubber requirements at current market rates.

Consumption of crude rubber by manufacturers in the United States for April was the highest for any month since June,



World, United States, London, Liverpool, Singapore and Penang Stocks



World's Production, U. S. Consumption, and Price of Ribs

1930, and is estimated to be 33,321 long according to R. M. A. official statistics, tons, an increase of 1.6 per cent over the Imports of crude rubber for April March consumption of 32,788 long tons, amounted to 46,648 long tons as compared

with 40,338 long tons for March and 49,927 long tons for April, 1930.

The Association estimates total domestic stocks of crude rubber on hand and in transit overland on April 30 at 228,382 long tons, an increase of 4.9 per cent over March, and 54 per cent over April, 1930.

Crude rubber afloat for United States ports on April 30 is estimated at 56,700 long tons as against 63,133 long tons on March 31 and 63,261 on April 30, 1930.

Shipments and stocks show little signs as yet of falling off, or consumption of increasing. While present prices are obviously unprofitable to producers, it is believed that it may be some months before any restrictive effect becomes evident as a

result of economic forces. Meanwhile the Dutch and British interests in favor of restriction are presumably continuing their efforts to reach some agreement and propose a generally acceptable scheme. No announcement has yet been made one way or the other, but it is now suggested in some quarters that the greater good of the industry would be served if they dropped their efforts for artificial restriction and directed them towards research and the development of new uses.

LONDON STOCKS

Week Ended	Tons
May 2	86,512
May 9	86,663
May 16	86,037
May 23	85,739

LIVERPOOL STOCKS

Week Ended	Tons
May 2	51,926
May 9	52,865
May 16	54,170
May 23	53,842

United States and World Statistics of Rubber Imports, Exports, Consumption, and Stocks

Twelve Months	U. S. Net Imports* Tons	U. S. Consumption Tons	U. S. Stocks on Hand† Tons	U. S. Stocks Afloat‡ Tons	London and Liverpool Stocks§ Tons	Singapore and Penang Stocks§ Tons	World Production (Net Exports) Tons	World Consumption¶ Tons	World Stocks|| Tons
1925	384,837	384,644	50,985	52,421	6,328	18,840	527,600	553,300	180,850
1926	411,962	358,415	72,510	51,238	51,320	26,443	621,900	542,000	273,060
1927	431,807	372,528	100,130	47,938	66,261	25,798	607,300	593,866	298,780
1928	446,421	442,227	66,166	68,764	22,603	32,905	653,837	686,945	284,198
1929	561,454	466,475	105,138	62,389	73,253	35,548	860,404	804,820	371,425
1930	488,343	375,980	200,998	56,035	120,575	46,003	815,835	702,935	492,165
1931									
January	37,098	28,557	209,487	56,188	124,456	49,802	65,856	62,430	438,317
February	36,645	28,797	212,833	63,680	128,938	49,283	65,075	62,000	454,734
March	40,338	32,788	217,804	63,133	133,841	49,590	65,009	61,000	488,076
April	46,648	33,321	228,382	56,700	139,528	45,868			

* Including liquid latex, but not guayule.

† Comprises U. S. consumption, United Kingdom absorption, and net imports for other countries.

‡ Includes stocks afloat but not in Colombo, Amazon Ports, Amsterdam, and Paris.

§ Stocks on hand the last of the month or year.

World Rubber Shipments—Net Exports

	Long Tons					
	Calendar Years		1931			
	1929	1930	Jan.	Feb.	Mar.	Apr.
British Malaya						
Gross Exports	579,524	547,043	41,579	41,951	48,589	43,453
Imports	161,612	133,876	11,029	9,672	12,009	9,977
Net	417,912	413,167	30,550	32,279	36,580	33,476
Ceylon	80,795	76,406	7,039	6,365	6,217	3,487
India and Burma	11,729	10,782	1,315	1,041	1,209	...
Sarawak	11,079	10,310	770	945	930	788
British No. Borneo	7,381	7,052	600	600	600	600
Siam	5,024	4,349	424	409	536	340
Java and Madura	66,010	69,755	5,923	4,869	...	...
Sumatra E. Coast	87,589	79,396	7,348	7,206	...	...
Other N. E. Indies	124,732	115,254	10,328	9,001	...	...
French Indo-China	10,147	9,877	1,218	900	992	610
Amazon Valley	21,148	14,260	994	1,271	1,338	629
Guayule	996	516	*75	*75	*75	*75
Guayule	1,275	1,095	...	...	...	...
Africa	4,596	3,961	*300	*300	*300	*300
Totals	860,404	816,180	66,884	65,261	...	...

* Estimate. Compiled by Rubber Division, Department of Commerce, Washington, D. C.

World Rubber Absorption—Net Imports

	Long Tons				
	Calendar Years		1931		
	1929	1930	Jan.	Feb.	Mar.
CONSUMPTION					
United States	472,000	376,107	28,807	29,049	33,076
United Kingdom	72,023	74,760	3,907	9,690	5,425
NET IMPORTS					
Australia	15,886	5,354	601	495	435
Austria	3,324	2,365	147	241	148
Belgium	9,445	16,740	986	785	...
Canada	35,453	28,793	1,709	1,927	3,012
Czechoslovakia	4,650	4,532	635	366	...
Denmark	799	1,147	54	111	...
Finland	976	1,262	40	24	...
France	59,342	68,503	5,954	...	...
Germany	49,078	45,488	3,847	3,374	3,545
Italy	17,169	18,570	1,036	1,393	418
Japan	34,284	32,731	2,861	3,264	...
Netherlands	3,022	2,924	348	157	...
Norway	813	1,143	74	46	...
Russia	12,626	16,229	1,775	1,022	...
Spain	2,400	2,400	240	201	392
Sweden	3,857	4,414	296	295	...
Switzerland	653	808	60	123	77
Others estimated†	7,000	7,200	*600	*600	*600
Totals	804,800	705,470	53,977	...	...
Minus United States	472,000	376,107	28,807	29,049	33,076
Total foreign	332,800	329,363	25,170	...	...

* Estimate to complete table. † Includes Argentina, Brazil, Chile, China, Cuba, Egypt, Estonia, Hungary, Latvia, Mexico, Poland, Portugal, and Union of South Africa.

Compiled by Rubber Division, Department of Commerce, Washington, D. C.

British Malaya

An official cable from Singapore to the Malayan Information Agency, Malaya House, 57 Charing Cross, London, S.W.1, England, gives the following figures for April, 1931:

Rubber Exports

Ocean Shipments from Singapore, Penang, Malacca, and Port Swettenham

April, 1931

To	Sheet and Crepe Rubber		Latex Concentrated	
	Tons	Tons	Tons	Tons
United Kingdom	6,571	19	...	...
United States	29,021	59	...	...
Continent of Europe	3,677	5	...	...
British possessions	1,086	...	...	...
Japan	2,640	2	...	...
Other countries	373	...	...	...
Totals	43,368	85	...	...

Rubber Imports

Actual Imports by Land and Sea

April, 1931

From	Dry Rubber		Wet Rubber	
	Tons	Tons	Tons	Tons
Sumatra	418	4,950	...	...
Dutch Borneo	403	2,352	...	...
Java and other Dutch Islands	55	41	...	...
Sarawak	761	27	...	...
British Borneo	121	16	...	...
Burma	176	22	...	...
Siam	231	109	...	...
French Indo-China	205	26	...	...
Other countries	56	8	...	...
Totals	2,426	7,551	...	...

Low and High New York Spot Prices

PLANTATIONS	1931*		May 1930		1929	
	Price	Change	Price	Change	Price	Change
Thin latex crepe	\$0.06 1/4	@ \$0.07 1/4	\$0.14 1/4	@ \$0.14 1/4	\$0.20 1/4	@ \$0.24 1/4
Smoked sheet, ribbed	.06	@ .06 1/2	.13 1/4	@ .14 1/2	.19 1/2	@ .23 1/2
PARAS						
Upriver fine	.08	@ .08 1/2	.15 1/4	@ .15 1/4	.21 1/4	@ .24 1/4
Upriver coarse	.04	@ .06 1/2	.07 1/4	@ .07 1/4	.12 1/4	@ .14 1/4
Upper caucho ball	.04	@ .06 1/2	.07 1/4	@ .07 1/4	.12 1/4	@ .14 1/4

* Figured to May 25, 1931.

Crude Rubber Imports by Customs Districts

Including latex, dry rubber content

	March, 1931		March, 1930	
	Pounds	Value	Pounds	Value
Massachusetts	4,189,009	\$353,232	4,050,977	\$630,499
New York	72,380,257	5,988,358	85,137,315	12,436,877
Philadelphia	527,900	35,370	969,028	129,817
Maryland	796,951	52,274	1,024,000	128,523
Virginia	1,507,520	114,642	509,582	65,143
Georgia	2,352,120	172,334	572,882	76,099
Los Angeles	9,103,788	675,024	6,831,008	958,146
San Francisco	108,564	9,856	96,044	14,433
Oregon	11,200	943	...	...
Dakota	...	...	42,590	6,288
Ohio	244,730	16,711	1,740,093	248,393
Colorado	142,600	13,046	394,377	66,423
Totals	91,364,639	\$7,431,790	101,367,896	\$14,760,641

Ceylon Rubber Exports

January 1 to February 22, 1931

To	Tons
United Kingdom	2,859.77
Continent	1,381.10
Other countries in Europe	12.67
Australia	326.25
America	7,817.49
Other countries in America	73.02
Egypt	4.00
India	6.64
Japan	92.04
Other countries in Asia	1.00
Total	12,573.98
For the same period last year	13,724.69

Annual Exports, 1923-1930

For the year	Tons
1930	75,602.18
1929	80,219.25
1928	87,825.48
1927	55,355.77
1926	58,799.56
1925	45,697.19
1924	37,351.13
1923	37,111.88

Principal Rubber Stocks

	Long Tons						
	1930			1931			
	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.
Malay Estates . . .	25,663	26,028	25,837	25,770	25,056	22,492	...
S. S. Dealers . . .	34,479	36,884	39,610	42,202	42,986	44,317	41,456
Other Malay Dealers . . .	12,924	14,523	15,082	15,850	17,971	17,735	...
Malayan Ports . . .	4,734	4,016	5,569	6,104	5,178	3,983	3,401
Totals	77,800	81,451	86,098	89,226	91,191	88,527	...
London	77,647	76,887	78,013	81,093	82,265	84,736	86,355
Liverpool	38,848	39,718	40,549	43,292	44,656	49,094	52,000
Totals	116,495	116,605	118,562	124,385	126,921	133,830	138,355
U. S. Inventory . . .	186,069	190,617	201,000	207,085	210,611	215,523	...
U. S. Afloat	50,441	51,837	55,288	55,439	63,680	63,133	56,700
Europe Afloat	27,630	24,220	25,980	24,500	24,580	*25,800	...
Totals	78,071	76,057	81,268	79,939	88,260	88,933	...
Grand totals	458,435	464,730	486,928	501,335	516,983	526,813	...

* Estimate.

Compiled by Rubber Division, Department of Commerce, Washington, D. C.

Export Duty on Rubber Suspended in Acre

A Brazilian Presidential Resolution dated February 11, effective upon publication in the *Diario Oficial* of February 13, provides for a six months' suspension of the export duty of 10 per cent of the export value, on rubber and chestnuts in the Territory of Acre. The decree states that it is intended to ameliorate the precarious situation of the producers of these products in that territory.

United States Statistics

Imports of Crude and Manufactured Rubber

	February, 1931		Two Months Ended February, 1931	
	Pounds	Value	Pounds	Value
UNMANUFACTURED—Free				
Crude rubber	76,172,116	\$6,564,969	157,500,874	\$13,755,560
Liquid latex	825,401	89,470	1,477,260	160,178
Jelutong or pontianak..	1,145,165	114,100	1,939,472	172,997
Balata	37,934	13,801	141,255	45,671
Gutta percha .....	.....	.....	123,330	13,343
Guayule .....	.....	.....	.....	.....
Siak, scrap, and re-claimed	473,696	6,676	1,361,322	13,170
Totals	78,654,312	\$6,789,016	162,543,513	\$14,160,919
Chicle				
Chicle, crude.....Free	1,137,888	\$564,723	1,799,333	\$884,475
MANUFACTURED—Dutiable				
Tires	1,053	\$7,569	1,552	\$11,123
Other rubber manufac-tures .....	.....	63,725	.....	132,981
Totals .....	.....	\$71,294	.....	\$144,104

Exports of Foreign Merchandise

RUBBER AND MANUFACTURES				
Crude rubber	4,035,448	\$357,473	2,901,113	\$711,369
Balata	16,816	5,731	39,675	8,329
Guayule .....	.....	.....	24,700	3,575
Gutta percha, rubber sub-stitutes, and scrap.....	672	108	2,172	363
Rubber manufactures..	.....	1,026	.....	1,251
Totals .....	.....	\$364,338	.....	\$724,887

Exports of Domestic Merchandise

RUBBER AND MANUFACTURES				
Reclaimed	1,401,176	\$69,419	2,855,393	\$142,610
Scrap and old	3,886,117	106,830	8,563,076	218,092
Rubberized automobile cloth	68,325	29,708	126,576	57,249
Other rubberized piece goods and hospital sheeting	64,933	29,044	150,380	66,608
Footwear				
Boots	25,794	70,461	73,378	177,031
Shoes	92,584	60,632	164,509	122,761
Canvas shoes with rubber soles.....	185,343	119,478	298,022	205,069
Soles	4,626	13,803	9,513	29,906
Heels	57,566	41,177	152,088	105,000
Water bottles and fountain syringes.....	33,782	13,458	49,775	20,871
Gloves	8,358	21,920	13,966	37,306
Other druggists' sundries	57,479	47,781	110,811	97,497
Balloons .....	.....	6,539	.....	13,133
Toys and balls	11,041	28,295	17,441	41,800
Bathing caps	38,961	15,415	76,026	30,227
Erasers	36,187	21,076	62,945	37,551
Hard rubber goods .....	.....	.....	.....	.....
Electrical goods	117,641	16,006	252,808	29,262
Other goods .....	.....	28,955	.....	45,638
Tires				
Truck and bus cas-ings	37,205	749,836	67,913	1,445,037
Other automobile cas-ings	121,484	952,712	252,044	1,979,355
Tubes, auto.....	110,729	165,303	213,872	311,801
Other casing and tubes	6,698	12,319	10,843	19,487
Solid tires for auto-mobiles and motor trucks	770	25,147	1,849	68,359
Other solid tires....	245,231	37,002	340,101	52,056
Tire sundries and re-pair materials .....	.....	71,151	.....	142,585
Rubber and friction tape	96,412	29,418	213,194	61,181
Belting	260,580	120,566	528,429	251,203
Hose	453,116	130,122	881,121	263,465
Packing	115,742	46,306	228,534	90,735
Thread	148,210	147,356	253,145	251,613
Other rubber manufac-tures .....	.....	137,227	.....	274,317
Totals .....	.....	\$3,386,063	.....	\$6,731,033

London Stocks, March, 1931

	Landed for Mar. Tons	De-livered for Mar. Tons	Stocks March 31		
			1931 Tons	1930 Tons	1929 Tons
LONDON					
Plantation	9,939	6,318	84,635	68,839	28,080
Other grades	1	1	50	44	83
LIVERPOOL					
Plantation	*5,923	*1,485	*49,094	*21,089	*4,326
Total tons, London and Liverpool	15,863	7,804	133,779	89,972	32,489

* Official returns from the recognized public warehouses.

United Kingdom Statistics

Imports

UNMANUFACTURED Crude Rubber From	March, 1931		Three Months Ended March, 1931	
	Pounds	Value	Pounds	Value
Straits Settlements	18,758,900	£284,615	51,253,300	£824,804
Federated Malay States	7,013,300	123,545	20,898,000	379,441
British India	1,363,500	23,070	4,612,200	79,402
Ceylon and Dependencies	2,368,300	39,587	9,029,000	157,251
Java and Dutch Borneo	3,294,400	54,206	8,232,600	142,917
Sumatra and other Dutch possessions in Indian Seas	1,579,000	28,703	4,781,200	85,859
Other countries in East Indies and Pacific, not elsewhere specified	577,000	10,355	1,350,300	24,800
Brazil	1,014,700	21,970	1,971,900	44,491
South and Central America (except Brazil) .....	.....	.....	1,500	24
West Africa				
French West and Equatorial Africa	11,000	184	14,000	234
Gold Coast	40,200	635	90,600	1,421
Other parts of West Africa	272,400	4,544	355,000	6,042
East Africa, including Madagascar	58,500	961	143,100	2,430
Other countries	125,200	2,348	356,100	7,199
Totals	36,476,400	£594,723	103,088,800	£1,756,315
Gutta percha and balata	243,800	15,380	975,800	76,837
Waste and reclaimed rubber	644,500	6,564	2,121,500	21,133
Rubber substitutes, synthetic	1,700	46	4,200	91
Totals	37,366,400	£616,713	106,190,300	£1,854,376

MANUFACTURED			
*Tires and tubes			
Pneumatic			
Outer covers	£18,109	.....	£43,510
Inner tubes	4,742	.....	14,250
Solid tires	2,033	.....	7,433
Boots and shoes	173,158	175,916	311,659
Other rubber manufactures	162,359	.....	440,934
Totals	£363,159	.....	£857,224

Exports

UNMANUFACTURED			
Waste and reclaimed rubber	940,200	£6,065	3,961,200
Rubber substitutes, synthetic	47,900	881	128,500
Totals	988,100	£6,946	4,089,700
MANUFACTURED			
Tires and tubes			
Pneumatic			
Outer covers	£225,590	.....	£638,224
Inner tubes	28,927	.....	78,880
Solid tires	4,637	.....	14,320
Boots and shoes	21,781	25,437	42,709
Other rubber manufactures	171,820	.....	485,768
Totals	£456,411	.....	£1,271,106

Exports—Colonial and Foreign

UNMANUFACTURED			
Crude Rubber			
To			
Soviet Union (Russia)	4,314,500	£102,921	9,047,400
Sweden, Norway, and Denmark	161,100	4,012	417,400
Germany	1,115,400	20,079	4,940,700
Belgium	525,600	10,210	3,342,300
France	1,556,500	28,779	4,911,200
Spain	124,700	2,458	308,600
Italy	529,600	9,247	1,534,700
Other European countries	252,100	6,081	1,039,200
United States	177,600	3,468	330,300
Other countries	87,800	2,817	404,500
Totals	8,844,900	£190,072	26,276,300
Gutta percha and balata	59,800	5,742	195,900
Waste and reclaimed rubber	28,000	441	78,100
Rubber substitutes, synthetic .....	.....	.....	.....
Totals	8,932,700	£196,255	26,550,300
MANUFACTURED			
Tires and tubes			
Pneumatic			
Outer covers	£1,513	.....	£34,618
Inner tubes	263	.....	1,619
Solid tires .....	.....	.....	.....
Boots and shoes	2,253	2,791	3,987
Other rubber manufactures	4,080	.....	13,735
Totals	£8,647	.....	£56,485

*Motor cars, motorcycles, parts, and accessories were liable to duty from Sept. 29, 1915, until Aug. 1, 1924, inclusive, and after July 1, 1925. Commercial vehicles, parts, and accessories were exempt from duty until April 30, 1926, inclusive, and tires and tubes until April 11, 1927, inclusive.

Rubber-Seed Oil for Paints

Para rubber-seed oil, it is claimed, should be superior to soy-bean oil for use in paint-making. Its percentage composition is given as: Linolenin 20.5, linolin 32.9, olein 28.5, palmitin 7.3, stearin 9.1, arachidin 0.3, unsapon, 0.8

United States Crude and Waste Rubber Imports for 1931 by Months

	Plantations	Latex	Paras	Africans	Centrals	Manicobas and Matto	Grosso	Totals	Balanta	Miscellaneous	Waste
						Guayule		1931	1930		
January	36,525	206	331	36	..	..	..	37,098	47,362	65	960
February	35,749	339	516	40	1	..	..	36,645	43,728	1	580
March	38,922	352	1,062	2	..	..	..	40,338	45,430	170	800
April	46,034	323	291	..	..	..	..	46,648	49,927	196	908
Total, four months, 1931	157,230	1,220	2,200	78	1	..	..	160,729	..	432	3,248
Total, four months, 1930	181,281	1,148	3,310	232	51	425	..	..	186,447	467	2,657

Compiled from Rubber Manufacturers Association statistics.

Tire Production Statistics

Pneumatic Casings—All Types				Solid and Cushion Tires			
	In-ventory	Production	Total Shipments		In-ventory	Production	Total Shipments
1928	10,217,708	58,457,873	55,721,937	1928	152,120	508,223	512,602
1929	9,470,368	54,980,672	55,515,884	1929	122,200	407,347	436,027
1930	7,202,750	40,772,378	42,913,108	1930	75,871	204,340	250,635
1931				1931			
January	7,165,846	2,939,702	2,995,479	January	75,205	12,631	13,072
February	7,628,520	3,188,274	2,721,347	February	73,338	11,358	12,915
March	8,011,592	3,730,061	3,297,225	March	68,584	11,424	16,152
Inner Tubes—All Types				Cotton and Rubber Consumption Casings, Tubes, Solid and Cushion Tires			Consumption of Motor Gasoline (100%) Gallons
	In-ventory	Production	Total Shipments	Cotton Fabric Pounds	Crude Rubber Pounds		
1928	12,087,464	60,131,381	57,845,189	1928	222,243,398	600,423,401	13,633,452,000
1929	10,245,365	55,062,886	56,473,303	1929	208,824,653	598,994,708	14,748,552,000
1930	7,999,477	41,936,029	43,952,139	1930	158,812,462	476,755,707	16,200,894,000
1931				1931			
January	7,551,503	2,898,405	3,249,734	January	12,738,467	36,318,980	1,127,532,000
February	7,936,773	3,132,770	2,720,135	February	12,002,161	36,651,119	1,097,208,000
March	8,379,974	3,559,644	3,031,279	March	14,040,803	41,850,638	1,303,302,000

Rubber Manufacturers Association figures representing 80 per cent of the industry since January, 1929, with the exception of gasoline consumption.

Rubber Goods Production Statistics

	1931					1930									
	Mar.	Feb.	Jan.	Dec.	Nov.	Oct.	Sept.	Aug.	July	June	May	Apr.	Mar.		
TIRES AND TUBES															
Pneumatic casings															
Production	3,730	3,188	2,940	2,251	2,123	2,866	2,692	3,332	3,193	4,098	4,574	4,518	3,891		
Shipments															
Domestic	3,143	2,580	2,855	2,550	2,119	2,613	3,360	3,976	4,229	4,050	3,960	3,886	3,587		
Exports	155	142	140	139	148	186	165	164	129	185	213	186	186		
Stocks, end of month	8,012	7,629	7,166	7,203	7,676	7,842	7,849	8,678	9,449	10,622	10,745	10,461	10,010		
Solid and cushion tires															
Production	11	11	13	13	13	18	14	16	13	17	17	17	19		
Shipments															
Domestic	15	12	12	12	13	19	22	22	19	18	23	23	22		
Exports	1	1	1	1	1	1	1	1	1	2	1	2	2		
Stocks, end of month	69	73	75	76	76	78	82	90	101	107	108	117	123		
Inner tubes															
Production	3,560	3,133	2,898	2,448	2,144	3,161	3,053	3,837	3,151	3,960	4,428	4,408	3,953		
Shipments															
Domestic	2,922	2,619	3,147	2,634	2,147	2,659	3,525	4,492	4,594	4,082	3,940	3,769	3,682		
Exports	109	101	102	96	84	119	108	118	90	131	119	109	99		
Stocks, end of month	8,380	7,937	7,552	7,999	8,250	8,414	8,052	8,589	9,326	10,889	11,082	11,028	10,543		
Raw material consumed															
Crude rubber	41,851	36,651	36,319	25,537	26,253	36,097	33,382	40,736	39,365	45,706	52,130	51,152	43,911		
Fabrics	14,041	12,002	12,738	8,358	8,418	11,780	10,917	13,223	13,399	15,034	17,437	17,264	14,656		
MISCELLANEOUS RUBBER PRODUCTS															
Calendered rubber clothing															
Net orders	19,380	16,361	21,884	12,881	15,493	25,082	39,364	26,348	28,767	21,249	110,520	89,862	97,612		
Production	19,220	18,276	13,059	20,791	22,623	41,291	37,097	44,952	38,582	55,411	75,719	86,471	78,858		
Mechanical rubber goods, shipments															
Belting	889	722	759	675	779	954	1,045	1,248	1,364	1,238	1,310	1,309	1,379		
Hose	1,892	1,611	1,440	1,337	1,276	1,554	1,473	1,682	1,856	2,199	2,703	2,593	2,500		
All other	1,631	1,378	1,400	1,326	1,345	1,678	1,565	1,622	1,690	1,881	2,150	2,087	2,101		
Total	4,412	3,711	3,599	3,338	3,400	4,186	4,083	4,552	4,910	5,318	6,163	5,989	5,981		
Rubber bands, shipments	231	222	211	165	165	197	172	164	174	177	211	197	248		
Rubber flooring shipments	496	366	365	597	432	682	529	559	507	634	615	570	533		
Rubber heels															
Production	14,661	13,156	12,973	13,101	11,083	16,460	14,322	13,735	15,117	15,795	15,603	17,762	15,439		
Shipments															
Exports	577	658	748	838	880	966	1,083	780	938	829	776	1,096	956		
Repair trade	4,868	4,854	3,939	3,450	4,473	8,291	6,681	6,622	5,053	5,186	5,221	4,641	7,189		
Shoe manufacturers	10,991	8,397	8,471	6,618	4,578	9,354	9,244	8,813	11,668	10,287	7,432	9,201	8,458		
Stocks, end of month	26,708	29,335	30,302	29,741	29,130	29,353	31,601	22,336	36,220	38,852	38,595	37,618	36,541		
Rubber-proofed fabrics, production															
Auto fabrics	738	644	577	476	532	915	733	678	608	851	1,239	1,368	727		
Raincoat fabrics	..	567	738	697	1,426	3,040	3,249	1,805	1,415	1,486	1,333	1,590	1,632		
All other	..	973	891	736	864	1,254	1,064	975	917	1,042	1,025	1,071	1,211		
Total	..	2,184	2,206	1,909	2,822	5,209	5,046	3,458	2,940	3,379	3,597	4,029	3,570		
Rubber soles															
Production	2,292	2,724	2,481	3,021	1,426	3,056	2,193	1,473	2,663	2,734	1,939	2,593	2,582		
Shipments															
Exports	14	36	11	58	60	82	74	74	34	31	27	28	54		
Repairs trade	408	290	287	243	280	492	333	317	364	309	332	380	407		
Shoe manufacturers	2,145	2,259	2,090	2,305	1,011	2,638	1,691	1,161	2,627	2,549	1,506	1,956	2,055		
Stocks, end of month	2,876	3,167	3,032	2,917	2,390	2,520	2,729	2,289	2,876	3,307	3,019	3,272	3,349		

Source: Survey of Current Business, Bureau of Foreign and Domestic Commerce, Washington, D. C.

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DIRECT IMPORTERS

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CRUDE RUBBER

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*Manufacturers' inquiries solicited
and will receive prompt attention*

Rubber Scrap

THERE is very little doing in the rubber scrap market. The prices on 13 of the 23 grades listed below are quoted lower than one month ago. Collections are sufficiently active to meet the current demand of consumers although the price returns to collectors and dealers are very unremunerative.

The matter of securing lower f.o.b. freight rates continues to be of great importance if the suppliers of scrap for the rubber industry are to procure substantial tonnages for the consumer at present low price levels. In this connection some reductions have been made, but traffic managers in the rubber industry are urged by scrap collectors and dealers to make further efforts to concentrate their fight for lower freight rates on scrap rubber.

Proposal No. 21,785 of the New England Freight Association mentioned in this column last month has become effective.

The prices quoted below are typical of the market for standard grades.

BOOTS AND SHOES are exceptionally dull. A few orders have been placed, but interest is generally absent. Colored boots and shoes first appear this month.

INNER TUBES. Collections are slow. The consuming demand holds fair. Floating tubes are becoming scarce, and the demand for them more active especially for the export trade.

TIRES. Collections are light because the freight zoning regulations control the matter of price for the material. Solid tires are in good request for both domestic consumption and for export trade, but ample supplies are difficult to obtain because of the increasing scarcity of solid tires; thus the price level holds very steady.

MECHANICALS. All grades in this classification are dull. Prices have been slightly reduced on airbrake hose and white mechanical scrap. The other grades are unchanged from the prices quoted last month.

HARD RUBBER. Stocks are moderate only. The price is quoted ¼-cent lower than a month ago.

CONSUMERS' BUYING PRICES Carload Lots

Delivered Eastern Mills
May 26, 1931

Boots and Shoes		Prices	
Boots and shoes, black, 100 lb.	\$1.10	@	\$1.15
Colored " " " " " " " "	.25	@	.85
Untrimmed arctics, 100 lb.	.75	@	.85
Tennis shoes and soles, 100 lb.	.50	@	.60
Inner Tubes			
No. 1, floating, 100 lb.	.04	@	.04½
No. 2 compound, 100 lb.	.02	@	.02½
Red, 100 lb.	.01¾	@	.0180
Mixed tubes, 100 lb.	.0170	@	.0180
Tires			
Pneumatic Standard			
Mixed auto tires with beads, 100 lb.	10.00	@	10.50
Beadless, 100 lb.	14.50	@	15.00
Auto tire carcasses, 100 lb.	12.00	@	12.50
Black auto peelings, 100 lb.	20.00	@	21.00
Solid			
Clean mixed truck, 100 lb.	27.50	@	28.00
Light gravity, 100 lb.	32.50	@	34.00
Mechanicals			
Mixed black scrap, 100 lb.	.00¾	@	.00¾
Hose, air brake, 100 lb.	10.00	@	10.50
Garden, rubber covered, 100 lb.	.00¾	@	.00¾
Steam and water, soft, 100 lb.	.00¾	@	.00¾
No. 1 red, 100 lb.	.01½	@	.01¾
No. 2 red, 100 lb.	.01	@	.01¾
White druggists' sundries, 100 lb.	.01¾	@	.01¾
Mechanical, 100 lb.	.01	@	.01¾
Hard Rubber			
No. 1 hard rubber, 100 lb.	.08¾	@	.09

N. E. I. Rubber Exports, 1930 and 1929

The following exports of estate and native rubber from the Netherlands East Indies for 1930 and 1929 are derived from "Maandstatistiek," estate exports as shown, except that latex is reduced to one-third the gross figure. Native exports of wet rubber and scrap have been reduced to a dry basis.

ESTATE RUBBER		1930	1929
Java			
Latex	134	157	
Sprayed	4,248	4,001	
Sheet	66,563	62,759	
Other	60	74	
Total Java	71,005	66,991	
Outer Possessions			
Latex	2,448	1,205	
Sprayed	7,929	14,851	
Sheet	72,956	67,271	
Other	532	459	
Total outer possessions	83,865	83,786	
Total Estate	154,870	150,777	
NATIVE RUBBER		1930	1929
Sumatra			
Sumatra East Coast	11,027	14,415	
Atjeh	473	522	
Tapanoeli	2,498	3,083	
Sumatra West Coast	491	788	
Riouw	6,643	8,062	
Djambi	19,870	22,808	
Palumbang	10,359	15,686	
Banka and Billiton	253	827	
Total Sumatra	51,614	66,191	
Borneo			
West Borneo	19,444	19,937	
South East Borneo	17,873	21,428	
Total Borneo	37,317	41,365	
Total native	88,931	107,556	
Grand total	243,801	258,333	

Oriental Footwear Competition

From two different sources the Bureau of Foreign and Domestic Commerce, Washington, D. C., receives reports concerning Oriental competition in rubber footwear.

In the first instance reference is had to imports from Japan, which it was claimed were seriously competing with the American article in the Philippines. The table below shows imports and prices of footwear from the United States and from Japan to the Philippine Islands.

IMPORTS OF CANVAS RUBBER-SOLED SHOES		United States		Japan	
		Pairs	Pesos	Pairs	Pesos
1928	1,117,476	1,810,012	178,652	68,300	
1929	1,088,464	1,536,905	169,541	123,459	
1930	317,188	504,543	301,315	252,649	
IMPORTS OF RUBBER BOOTS AND SHOES					
		Pairs	Pesos	Pairs	Pesos
1928	95,975	191,911	7,715	2,125	
1929	455,235	761,757	22,221	5,337	
1930	147,562	269,066	46,868	11,448	

The sharp drop in the imports from the United States against the considerable increase in Japanese shipments in 1930 is conspicuous, as is the difference in the prices of the goods from the two countries. Taking the peso at \$0.50, a pair of canvas rubber-soled shoes from the United States is valued at \$0.80, against \$0.42 for that from Japan; while rubber boots and shoes work out at \$0.91 per pair for the United States product, but only \$0.122 for that from Japan. In the latter case, however, the Japanese article is merely a coolie slipper

consisting of a rubber sole with cheap cloth upper to fasten around the foot; this construction accounts for the unusual price.

In the second instance we have to deal with the production costs of Yah Kah Hop Yee, a representative rubber footwear firm in Canton, China, which produces about 2,000 pairs daily. Machine operators get \$14 Canton currency (\$5.45 U. S. currency) per month for the 10-hour day, with additional \$14 if they work on the night shift from 7 p. m. to 11 p. m. as well. The chief engineer receives \$60, and his assistant \$45 per month, Canton currency.

The shop is equipped with machines manufactured locally. The chemicals come from a British firm in China, the rubber from Singapore, and the fabric formerly was American duck for the better shoes, but since the price, owing to the rate of exchange, has become too high, an inferior duck made in Canton and costing less than half the American article, is now used.

Wholesale prices range from \$0.60 for the cheapest style of Chinese shoe to \$2.10 for the most expensive shoe, a copy of a well-known American brand, and all quoted in Canton currency. The manager of the plant, trained in Singapore, is optimistic over the immediate future of the domestic shoe trade as the exchange rate makes imported goods prohibitive to most Chinese, while at the same time it permits the local manufacturer to quote attractive prices for export, which is to Java and Singapore.

Rubber on the Desk

WE HAVE become accustomed to seeing many artistic objects of bakelite or other composition materials, but the newest development, perhaps, is in molded rubber.

Desk sets are now available in variegated rubber combining red and green, green and tan, blue and red, or blue and tan to harmonize with their surroundings.

These desk sets include a combination inkwell and pen tray with a removable cover and a stamp moistener on the order of the "grindstone," which is quite ingenious. The lower part is the trough which holds the water, and the middle of each side has a small slot into which fit the ends of a metal pin that passes through the molded rubber wheel. When the wheel is mounted thus in position, it turns freely and carries the water along on its face quite as efficiently as stamp moisteners of china or metal.

Rubber Trade Inquiries

The inquiries that follow have already been answered; nevertheless they are of interest not only in showing the needs of the trade, but because of the possibility that additional information may be furnished by those who read them. The Editor is therefore glad to have those interested communicate with him.

- No. INQUIRY
- 1357 Supplier of Degras or wool grease.
- 1358 Manufacturer of vacuum cups.
- 1359 Manufacturer of tire buffing machine suitable for buffing out cracks of automobile tires.
- 1360 Manufacturer of Cannonball Baker chair cushion.
- 1361 Manufacturer of machine that bundles rubber shoe soles.
- 1362 Manufacturer of flexible rubber molds.
- 1363 What company develops molded rubber specialties.
- 1364 Manufacturer of metallic footwear lasts.

